

VIGYAN RAIL

SCIENCE EXHIBITION ON WHEELS

B. S. Padmanabhan



VIGYAN PRASAR

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Vigyan Prasar

50, Institutional Area, Sector 62,

Noida 201 307 (UP)

(Regd. office: Technology Bhawan, New Delhi – 110016)

Phones: 0120-2404430 - 35

Fax: 91-120-2404437

E-mail: info@vigyanprasar.gov.in

Internet: <http://www.vigyanprasar.gov.in>

Vigyan Rail

Science Exhibition on Wheels

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Vigyan Rail - Science Exhibition on Wheels : logo.

PREFACE

Thanks to the vision of our first Prime Minister Jawaharlal Nehru and the keen interest taken by successive Governments, a strong foundation has been laid through a network of national laboratories and scientific Departments/ Ministries to promote scientific research and technological developments over the last five decades since Independence. As a result, India has made significant strides in R&D in different disciplines.

Our achievements in Science and Technology since Independence have been remarkable, covering a wide range of disciplines, from space to ocean depths and from nuclear to renewable energy, among others. All these have helped to bring about a visible improvement in the quality of life of the people as manifested by the expansion of communication facilities, penetration of telephones in rural areas, increased food production, prevention of diseases, enhancement of the military strength of the country, reduction in dependence on imports of essential drugs, and so on.

However, public awareness of these achievements has been found wanting. It was in this context that Vigyan Prasar, an autonomous organisation was set up by the Department of Science and Technology, Government of India. The aim was to disseminate information on our accomplishments in S&T among the general public, and inculcate scientific temper among them.

As one of its initiatives in this direction, Vigyan Prasar organized the Vigyan Rail - Science Exhibition on Wheels. It displayed exhibits put up by various Scientific Departments and agencies not only highlighting our achievements in Science and Technology since Independence, but also our scientific heritage.

Vigyan Rail travelled throughout the country attracting thousands of visitors from different strata of society wherever it halted. The exhibition halted at 60 railway stations over a period of eight months during the period 15 December 2003 to 20 August 2004. From all accounts, it made a deep impact on the visitors especially among the students in the remote parts of the country, who for the first time had access to a treasure of information and knowledge under one roof and near their homes.

This Pictorial Album records the cross-country journey of the Vigyan Rail highlighting the various exhibits and the response it evoked among the public. It is hoped that this would benefit those who could not visit the Vigyan Rail.

I feel privileged to be associated with this initiative and would like to place on record the support extended to me by Dr. V.B. Kamble, Director, Vigyan Prasar and his colleagues, especially Dr. Subodh Mahanti and Shri Rintu Nath.

New Delhi
Date 28 February 2006

B.S.Padmanabhan

FOREWORD

Railways have played an important role in the social and economic development of the country for over one and a half centuries, besides being a means of communication and transportation. A powerful network like the Railways could be effectively utilized for a direct contact with the people with an aim to spread scientific awareness and help them develop a scientific outlook. This was the thought which prompted Shri M. V. Kamath, President, Vigyan Prasara Society to ask a question in one of its General Body Meetings: “Can we have a train moving throughout the country carrying an exhibition depicting the achievements of the country in different fields of Science and Technology?” Well, the idea, strongly supported by Dr. Murli Manohar Joshi, the then Minister of Science and Technology, Human Resource Development, and Ocean Development; and Shri Nitish Kumar, the then Minister of Railways, culminated into “Vigyan Rail – Science Exhibition on Wheels”, a prestigious project conceived, formulated and implemented by Vigyan Prasara jointly with the Ministry of Railways, and with active support from the Department of Science and Technology (DST) – in particular Professor V. S. Ramamurthy, Secretary, DST and Chairman, Governing Body, Vigyan Prasara; and Shri R. K. Singh, Chairman, Railway Board.

The project was undertaken with the active participation of Departments and Ministries of Government of India engaged in fields related to Science and Technology. Vigyan Prasara prepared a detailed project report with inputs from Ministry of Railways. The response of the participating Departments and Ministries - eighteen in all - was truly overwhelming. Vigyan Rail carried exhibits and activities depicting India’s achievements in various fields of Science and Technology with emphasis on the achievements in the post-Independence period.

Vigyan Rail – Science Exhibition on Wheels was flagged off by Shri Atal Bihari Vajpayee, the then Prime Minister of India, on 15 December 2003 from Delhi Safdarjung Railway Station. During its entire journey, Vigyan Rail – Science Exhibition on Wheels helped people become aware about how science and technology have helped our country of a billion plus take giant strides on its way to self reliance in the fields of agriculture and food production, medicines and pharmaceuticals, defence, space, and how India is on a fast track to becoming a super power in the field of Information Technology. At the same time, the exhibition focused on the arduous path and the determined efforts of our scientists who made it possible and immensely contributed to the social and economic growth of the country. In this sense Vigyan Rail – Science Exhibition on Wheels was the saga of Indian Science – from the early Vedic period till the modern times. Visit to the Vigyan Rail helped expose our younger generation - especially the school children - to the thrill, challenges and opportunities a scientific career offers.

The epic journey of Vigyan Rail that lasted over eight months ended on August 2004. After visiting 60 destinations throughout the country covering 15,000 kilometres, it finally chugged into Delhi Safdarjung railway station in August 16, 2004 from where it had steamed out on December 15, 2003. At every place it visited, from Rajkot to Tinsukia and Pathankot to Kanyakumari, it received a thunderous welcome. An estimated five million people visited the Science Exhibition on Wheels during this period. Indeed, this was a historic event for the country in the field of science communication – perhaps in the world.

Surely, Vigyan Rail was a unique experiment, and it has proved how people crave for information and knowledge about science and technology they use everyday or the environment they live in. This was more conspicuous amongst children. The children always outnumbered the grown ups. It became almost a regular phenomenon to find them take down notes assiduously in each coach, either out of their own interest, or because it was an assignment from their science teacher. Vigyan Rail, along with an element of novelty, offered a unique opportunity for access to information in countryside. Vigyan Rail was once again on track in 2005 for three months and travelled to places it could not cover in its first phase under the aegis of National Council for Science and Technology Communication.

Vigyan Rail created ripples in several countries. There were requests from France for information on Vigyan Rail. A scientific delegation from Argentina visited Vigyan Rail in Delhi. A member of the delegation expressed, “If we are carrying something back to our country, it is the concept of Vigyan Rail!” A member of the American Embassy who visited the train exclaimed, “Now I want to have a science train in California, my home State!”

The guidance and cooperation by the Ministry of Railways was exemplary. In particular I would like to mention Shri Sandeep Silas, Director, Information and Publicity, Railway Board, and his wonderful colleagues. The enthusiasm of the participating Ministries/Departments was contagious.

With a view to reach a larger section of the society, Vigyan Prasar has brought out a DVD and a four- part film on Vigyan Rail. In the present book, lavishly illustrated, we have attempted to document the entire journey of Vigyan Rail ever since it was a mere dream to its realization. This journey has been lucidly narrated by the well known science journalist Shri B. S. Padmanabhan. We are thankful to him for readily agreeing to pen the saga. We are also thankful to Shri Biman Basu, Former Editor, Science Reporter, for going through the manuscript and suggestions for its improvement.

Vinay B. Kamble
Director
Vigyan Prasar

OVERVIEW

For over 150 years the vast network of Indian Railways has been bringing people from different parts of the country closer, thereby promoting cultural integration and economic development. For the first time in 2004 this network was utilized to bring people and science closer by showcasing on wheels, and taking to the doorsteps of the people, the country's scientific and technological heritage and progress over the years.

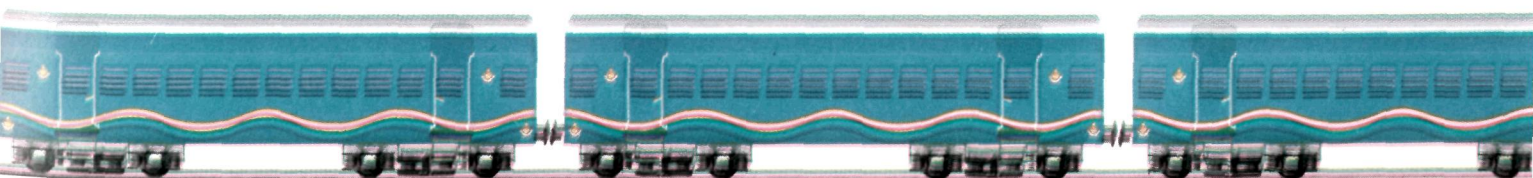
The initiative for this unique project, christened Vigyan Rail, was taken by Vigyan Prasar, an autonomous body under the Department of Science and Technology with active participation and support from 18 scientific departments and agencies of the Government of India. The main objective was to generate awareness among the people about the contribution made by science and technology to the giant strides taken by the country in different sectors since Independence.

From all accounts the eight-month journey of this Science Exhibition on Wheels over 15,000 kilometres, covering 60 railway stations, had been quite fruitful in achieving its objective. Not only that, it had helped in re-kindling the declining interest among the younger generation in science, as manifested by the fall in recent years in the number of students seeking admission

to science streams in schools and colleges, which has been a cause for concern.

This re-kindling of interest in favour of science is no mean achievement considering that no nation can survive in the present era of globalization, economic liberalization and rapid advances in technology unless it becomes economically competitive and technologically powerful. This in turn calls for a paradigm shift in the mindset of the people in favour of science and technology.

How can one promote scientific outlook among the public? This question has been agitating the minds of policy makers and programme administrators for quite some time. The Vigyan Prasar, set up for this very purpose, has been taking a number of initiatives towards this goal. But an idea mooted at a meeting of the Vigyan Prasar Society by its President, Shri M. V. Kamath clicked. "Can we have a train moving throughout the country carrying an exhibition depicting the achievements of the country in different fields of science and technology?" queried Shri Kamath, a distinguished journalist. "Why not?" was the immediate response from all those present at the meeting. This is not surprising because the railways touch far-flung areas and the sight and sound of a train are always keenly awaited in the



countryside. What better means could there be to take science to the masses than a train?

Soon the idea got the nod from the then Minister for Human Resource Development Dr Murli Manohar Joshi, who was in charge of the Ministry of Science and Technology and from Shri Nitish Kumar, who was then Minister for Railways. It did not take much time for the idea to blossom into a viable project, regarded as the first of its kind in the world.

Only a few months earlier an Exhibition on Wheels, depicting the 150 years of service of Indian Railways (1853-2003), had completed its journey throughout the country and returned to the base in Delhi. Thus the rolling stock was ready and it only needed to be refurbished for another Exhibition on Wheels, but on a different theme. The authorities of Vigyan Prasar swung into action, backed by the Department of Science and Technology and the Ministry of Railways. All the departments and agencies having an element of science and technology under their charge actively participated.

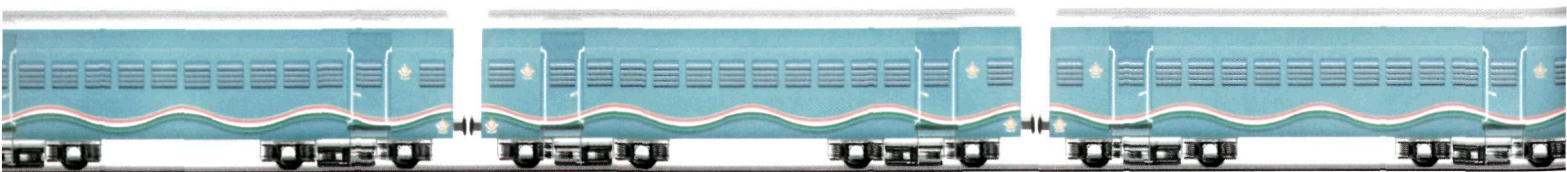
It was felt that each coach should focus on a particular theme and the refurbishing of the train called for certain amount of creativity and imagination to ensure that the interior decoration and arrangement of the exhibits were in harmony and synergy with the theme sought to be projected. The participating Ministries/Departments and organizations planned the designs to suit the theme and the Railway Ministry, which had gained sufficient experience and expertise in running an Exhibition Train, took charge of preparing the train for this Science Exhibition on Wheels. In a short span of a few months the fabrication was com-

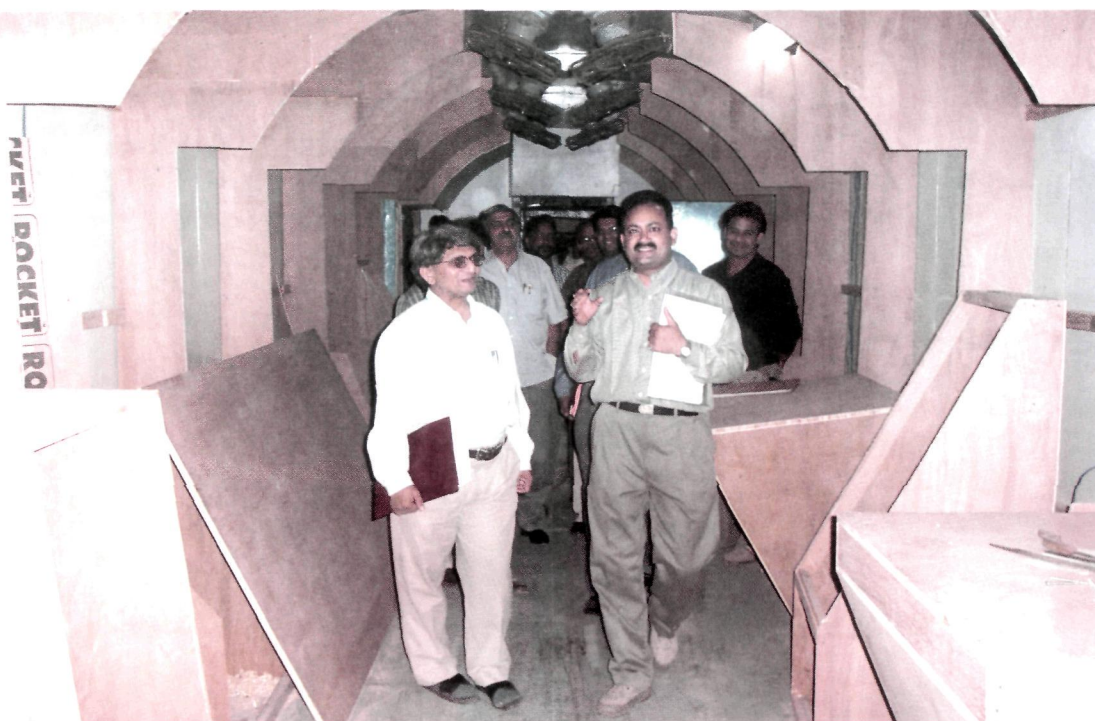
pleted at the Safdarjung Railway Station in Delhi and the train with 12 coaches, interconnected with each other, was ready with attractive models, charts, panels and audio-visual aids in each coach. In addition there were five coaches to accommodate the operating and support staff.

The journey began from, and concluded at, Safdarjung Railway Station in Delhi. The same route, which the Railways took for its Exhibition on Wheels in 2003, was chosen for this Science Exhibition on Wheels also. The reason is not far to seek. It was felt that from the operational point of view it would be better to follow the route already taken by a similar train. This marked the launch of a project, whose uniqueness lay in the fact that for the first time an opportunity was provided to the people in remote corners of the country to have a glimpse of the nation's progress in the field of science and technology.

The train was flagged off by the then Prime Minister Shri Atal Behari Vajpayee on December 15, 2003 but it actually left a week later giving an opportunity for the Delhiites to have a glimpse of the exhibits. It returned on August 16, 2004 to the same station and remained there for five days. The concluding function was held on August 18, 2004 with Shri Kapil Sibal, Minister of State (Independent Charge) of Science and Technology and Ocean Development as the Chief Guest.

During its journey, the exhibition attracted over 5 million visitors. It was winter when the train covered the northern States and summer when it moved down south. But braving the cold and the heat the visitors came not only from the town where the railway station was located but also from

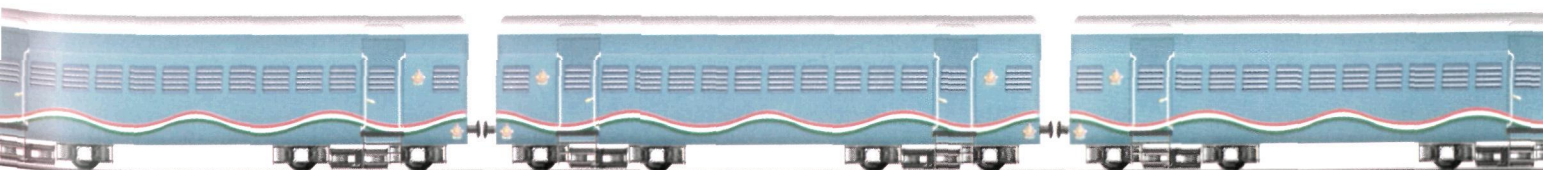




Vigyan Rail : The early phase.



Dr. Murli Manohar Joshi, the then Minister (HRD, S&T and Ocean Development) explaining the logo. Also seen is the then Minister of State (S&T), Shri Bachi Singh Rawat.

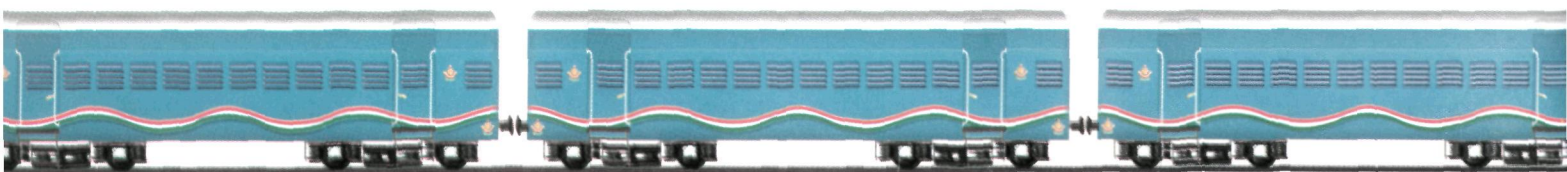




Assessing the progress of Science Exhibition on Wheels (From L to R): Shri Bachi Singh Rawat, the then Minister of State (S&T), Shri R. K. Singh, the then Chairman, Railway Board, Shri M. V. Kamath, President, Vigyan Prasasr Society and Professor V. S. Ramamurthy, Secretary, DST.



The Final Inspection.



the surrounding areas. They were from different strata of society in different age groups and with different educational backgrounds. But there was no difference in the level of knowledge they derived from the visit. The intention was to reach the common man and that was achieved beyond expectations. The visitors did not just move along from one coach to the other but made incisive inquiries about the exhibits. They were keen to understand the contribution made by science and technology in diverse fields. Some took photographs of the exhibits.

As many as 18 scientific departments and agencies of the government displayed exhibits covering a wide spectrum ranging from agriculture to atomic energy and from ocean depths to the space. The exhibits traced the development of Indian science and technology from the days of Aryabhata to the present era of the chip, which led to a revolution in Information Technology and brought countries closer at the global level and the rural and urban areas closer at the national level.

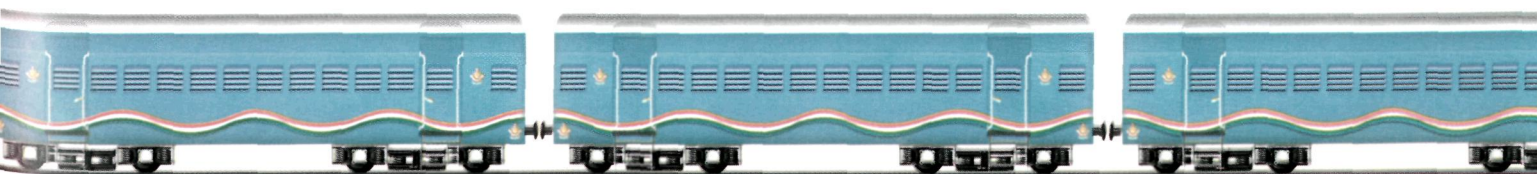
For the first time the people in the remotest areas came to know how science and technology helped in achieving self-sufficiency in food, wiping out diseases like small pox, etc., reducing dependence on imports in a range of commodities, improving connectivity through satellites and telecommunications, probing the ocean depths, meeting the energy needs of the growing population, etc. Not only that, the visitors also had a glimpse of what is in store in the future.

The media coverage and the response of the visitors bear testimony to the success of this first-ever venture of this kind in the history of Indian science and technology.

“If your child asks too many questions about science and is curious to know why the environment is in danger or what green revolution is, and if you don’t know the answers, don’t get disheartened. Just take him to Charbagh Railway Station, where an exhibition on Vigyan Rail will satisfy the craving for information of your child”. This comment in the Lucknow edition of the *Hindustan Times* is typical of the general perception about the Vigyan Rail. The media described it as a “unique mission” and an “eye-opener” and observed that “the exhibition goes beyond textbooks”.

Two other comments from spectators sum up neatly the common man’s perception of the Vigyan Rail. One wrote, “*Yeh Pradarshani to gagar mein sagar hai*” (In this exhibition the entire ocean has been accommodated in a pitcher.); and another commented, “*Kuan khud chalkar pyase ke pas aya hai*” (The well itself has come to the thirsty.). It may be impossible to bring the ocean in a bucket or to take the well to the thirsty. But this exhibition has made it possible to bring a wealth of information in a capsule form in a train and take it to the people thirsting for knowledge.

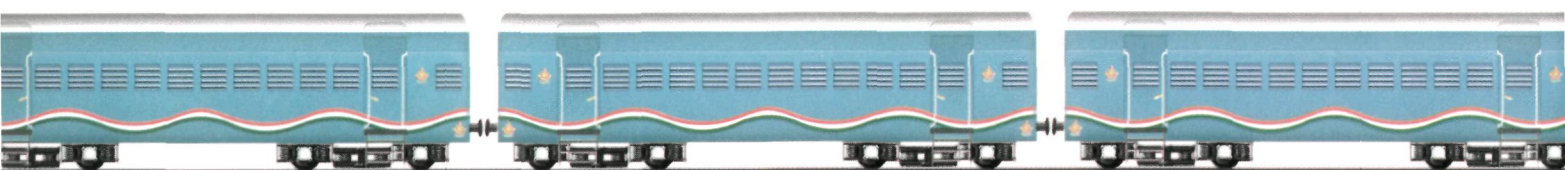
Though the response to the exhibition was overwhelming, there were certain limitations. The period of stay at each station was 2-5 days and this was found to be too short to accommodate the large number of interested spectators. The result was long queues at every halt. The timing was from 10 a.m. to 7 p.m. but at some halts the rush was such that the exhibition had to be kept open till late in the night. In a multi-lingual nation like ours the visitors expected the exhibits to be in their respective languages and not just in English or Hindi. This is



understandable, as they would be able to appreciate the exhibits better if these were in their own respective languages. But it is not feasible to have the panels in all the regional languages. So the organizers had arranged for volunteers to explain the exhibits to the visitors in the local language. In addition to experts from the participating Ministries/Departments and organizations, volunteers with background in science were chosen locally and briefed about the

exhibits so that they in turn could explain them to the visitors in the local language. However, in some places the number of such volunteers was not adequate to satisfy the visitors.

Notwithstanding these, the overall experience gained by Vigyan Prasar and the participating government departments and agencies has been quite positive and encouraging.



THE EXHIBITS

2

The Vigyan Rail was designed in such a way that visitors could enter the first coach and move on to the last coach without having to get down at any stage, as all the coaches were interconnected. Starting with the nation's scientific heritage the exhibits portrayed the progress in diverse areas concerning national security, energy security, agriculture, health, communication, information technology, space, and so on.

COACH
1

Our Scientific Heritage

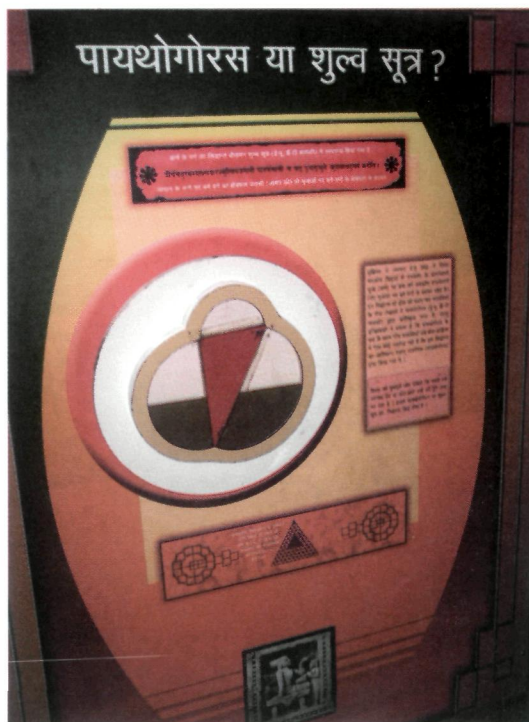
NATIONAL COUNCIL OF SCIENCE MUSEUMS,
DEPARTMENT OF CULTURE

As one entered the first coach, panels depicting the nation's heritage in S & T and the contributions of eminent Indian scientists who had earned laurels at the national and international levels, and the modern shape of things greeted the visitor. Put up by the National Council of Science Museums, which is under the Department of Culture in the Central Government, the exhibits were primarily panel-based, supplemented by hands-on participatory exhibits, computer-interactive panels and video shows.

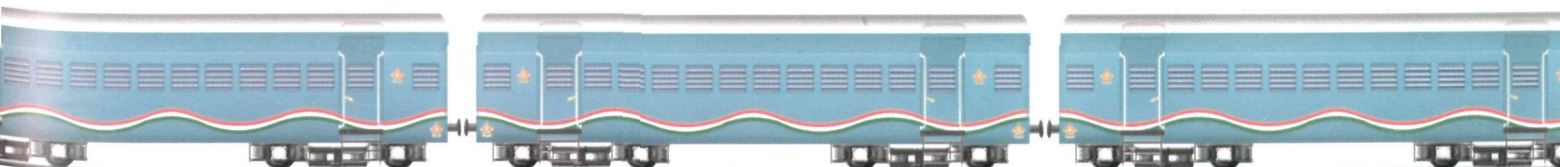
The panels portrayed the skills in mathematics, geometry, physical science, astronomy, medicine and metallurgy, which our ancestors had possessed and passed on



Surgical instruments used in the past resembling heads of different birds and animals



Explaining the Pythagoras theorem



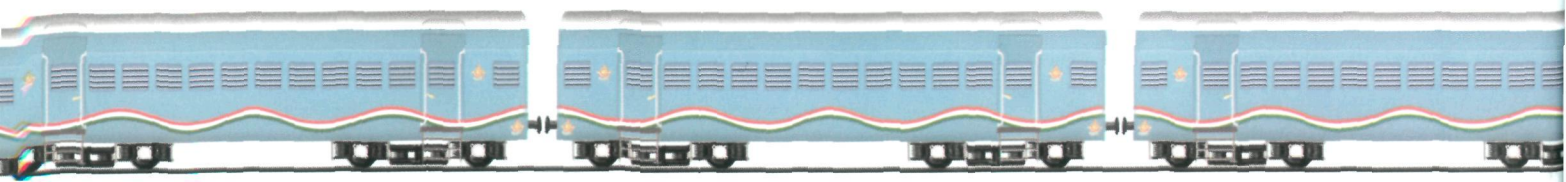
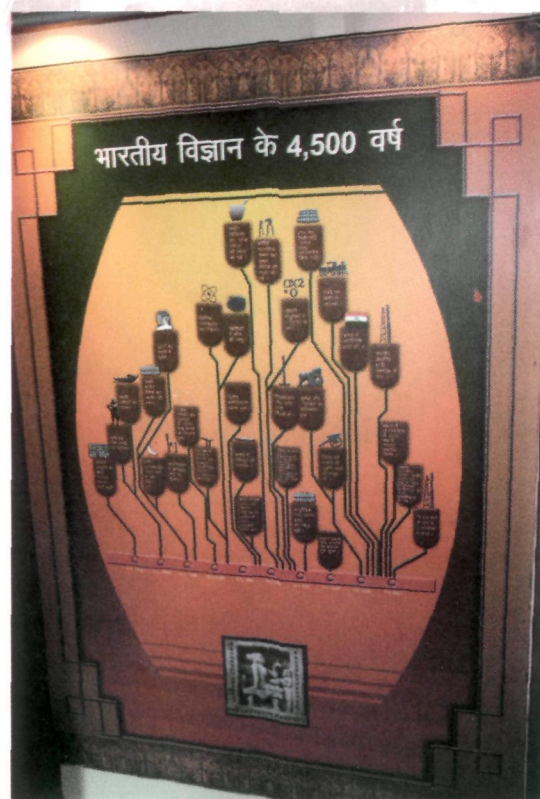
Explaining the concept of π (pi)



to successive generations. Exhibits on Aryabhatta's work, Triguna, Sulba-sutra, Circle and its Diameter, Zero and the concept of π (pi) added a special dimension to the display. A computer interactive exhibit took the visitor through 4,500 years of Indian science and technology. Exhibits of surgical instruments, which were commonly used in the past, brought out the ancient skill India possessed in the field of surgery. The heads of these instruments resembled the heads of different animals and the exhibits were re-created from the Susruta text of the 2nd century AD. The accompanying panels quizzed the visitors to identify the animals.

The rise of modern Indian science had its roots in the 19th century and scientists like J.C. Bose, S. Ramanujan, P.C. Ray, C.V. Raman, M.N. Saha, S.N. Bose, P.C. Mahalanobis, S Chandrasekhar, Homi Bhabha, Birbal Sahni and Vikram Sarabhai, who had made significant contributions to the world of science in the 20th century. Besides their portraits, interesting information connected with their lives and works were on display. For example the photograph of the house in which S. Ramanujan was born and the Nobel Diploma Certificate received by C.V. Raman were among the exhibits. There was a panel exclusively devoted to women scientists, which sought to kindle the interest of young girls in pursuing a career in science. A video show based on interviews with women scientists was an added attraction.

Display, which takes the visitors through 4,500 years of Indian history of science and technology.



COACH
2

Environment: Conservation and Sustainable Development

MINISTRY OF ENVIRONMENT AND FORESTS

After the nostalgia of the hoary past the visitors had a feel of the present day realities in the second coach wherein the exhibits highlighted the rich bio-diversity of our country and the importance of conserving it in order to ensure sustainable economic development. The panels put up by the Ministry of Environment & Forests sought to bring out the relationship of man with nature. Starting with the necessity of sustainable development the panels in this coach pictorially depicted the manner in which trees were protected in the past. One of the panels recalled the Indian tradition of nature conservation dating back to the Vedic period, which had continued throughout history. Emperor Ashoka's edicts, *Babarnama*, Jehangir's memoirs, and the Bishnoi's sacrifice were highlighted as symbolic of conservation ethos enshrined in the Indian psyche. The same ethos continued now in the form of Chipko movement and Appiko movement. Besides depicting the benefits accrued from a tree, the exhibits also depicted nature conservation efforts by Governments, NGOs and the community at large, through schemes like National Green Corps and Joint Forest Management, to indicate how the traditional practices were being continued.

The visitors also got an idea of what bio-diversity meant and the status of India in the global context. The variety of plants, animals and microorganism in any life supporting system represented the bio-diversity of a nation. The panels highlighted the fact that India, with 1,28,000 species of

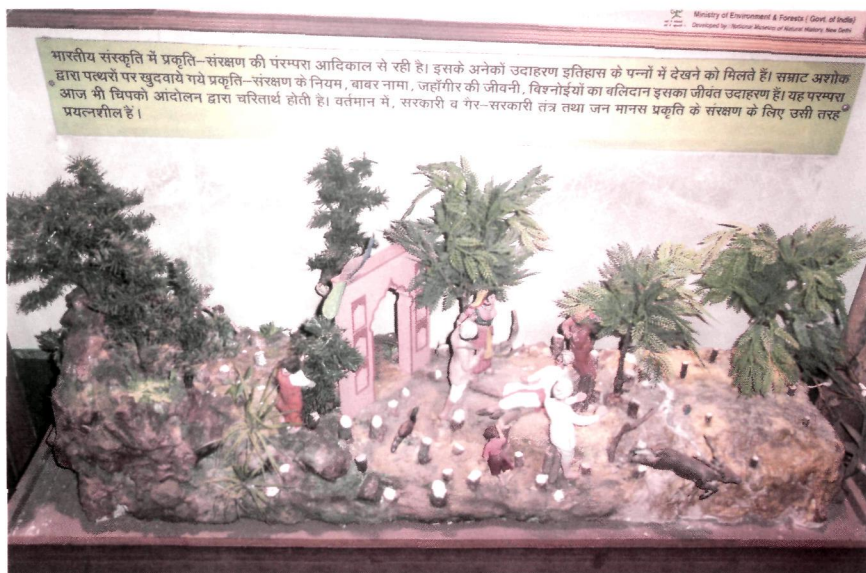
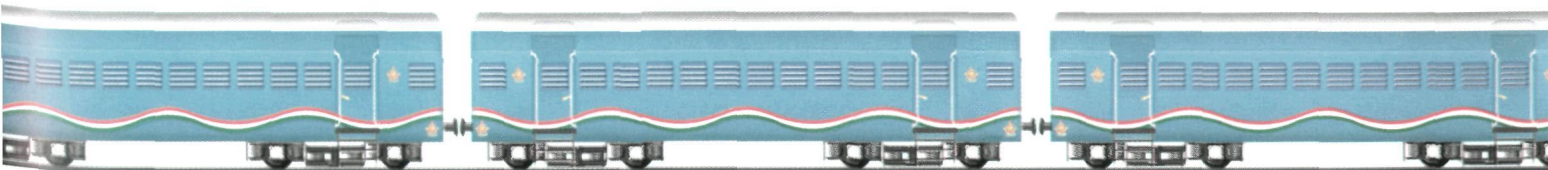
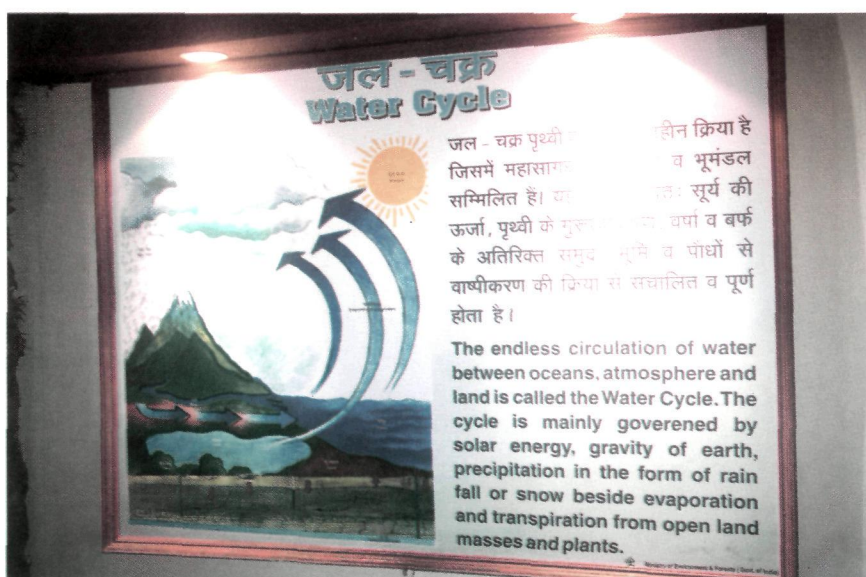


Exhibit depicting the Indian tradition of environmental conservation – the Bishnoi community in Rajasthan protecting the trees sacrificing their own life

Panel illustrating the Water Cycle—the endless circulation of water between oceans, atmosphere and land





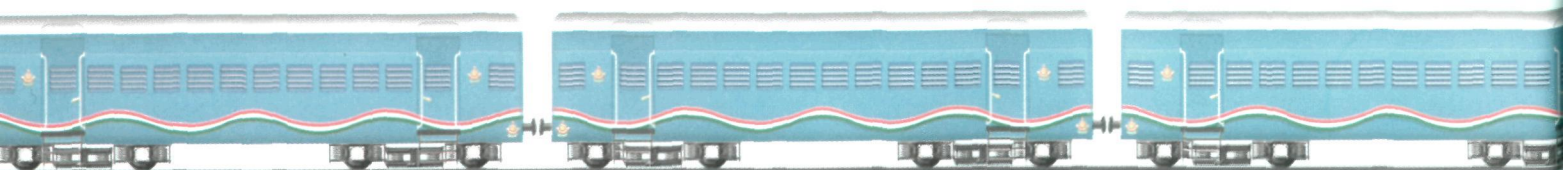
A forest environment created in the display area

plants and animals, had been recognized as one of the 12 mega Bio-diversity Centres in the world. Of these, animal species accounted for 81,000, which was 6.5% of the global number and the remaining 47,000 were plant species, representing 7% of the global number. Also highlighted were the diversity in flowers, orchids and insects. Anyone viewing these panels would agree that the country should not lose this gift of nature by indiscriminate destruction of forests and wildlife. The panels highlighting the elements constituting the environment and the need to preserve them only strengthened this feeling. What was expected of the citizen to do and not to do in order to preserve nature was also detailed in one of the panels. The exhibits emphasized the point that development goals should be achieved without harming nature and that only by conserving natural resources could one ensure sustainable development.

Exhibit displaying the imbalance in nature brought about by human activities



Some of the panels explained the Water Cycle and highlighted the threats posed by the pollution of atmosphere and water bodies. They also detailed the ways and means of tackling both air and water pollution. In this context one of the panels brought out how in the wake of the Green Revolution the increased use of pesticides and insecticides had resulted in pollution, which had become a cause for concern. There was also an interesting panel on different varieties of grasses, which served as sources of food for humans and fodder for animals.



COACH
3

Progress in Nuclear Science

DEPARTMENT OF ATOMIC ENERGY

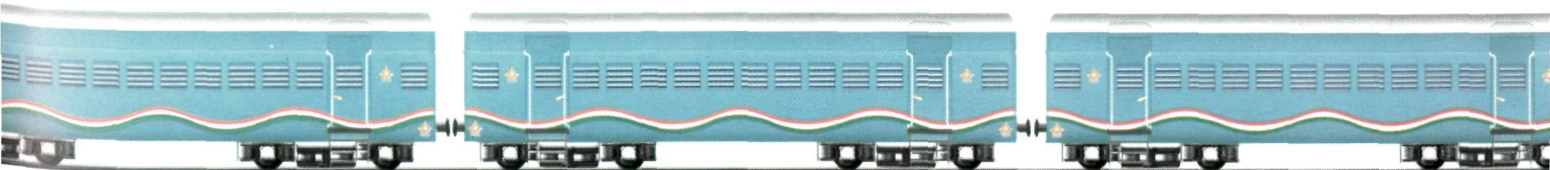
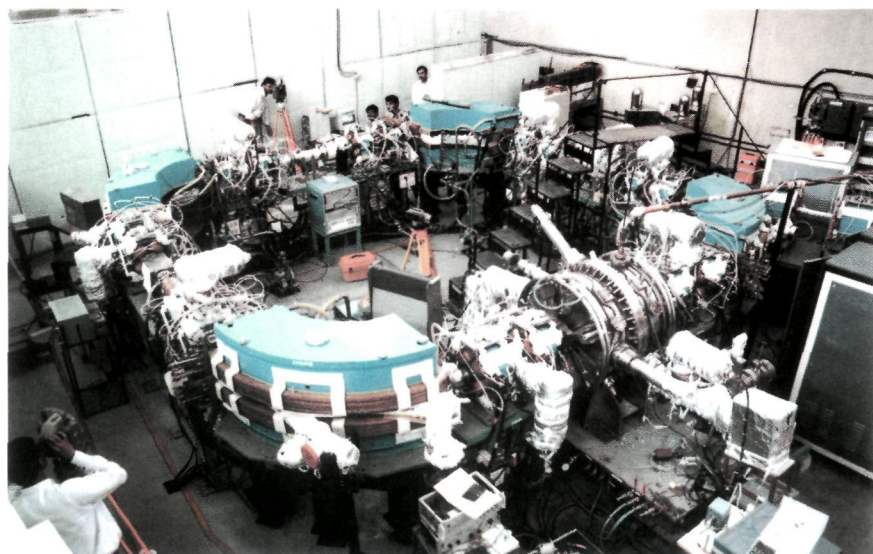
Sustainable development called for use of clean energy, which did not pollute the atmosphere, and nuclear energy fitted the bill in this respect. India recognized this soon after Independence when the ambitious atomic energy programme was launched. Thanks to the vision of the first Prime Minister Jawaharlal Nehru and the contribution of scientists like Homi Bhabha, the country's atomic energy programme had made significant strides over the last five decades. In fact, within a decade of the launch of this programme India became one of the first 10 most advanced countries in the area of nuclear technology. The exhibits depicted the story of the nation's efforts to tap nuclear energy not only for generation of power but also for other uses like medical diagnosis and treatment, and crop improvement by the Department of Atomic Energy (DAE), which had recently completed 50 years of service.

The DAE is a broad-based multidisciplinary organisation engaged in basic and applied research, and development of technology and its applications in industry. Its mandate is the production of safe and economical nuclear power from indigenous uranium and thorium resources. It builds and operates research reactors for the production of radioisotopes and carries out programmes on isotope and radiation technology and its applications in the fields of medicine, agriculture and industry. It also supports basic research in nuclear energy and related frontier areas of science, interacting with universities and academic institutions.

Atomic minerals
mined from
different states



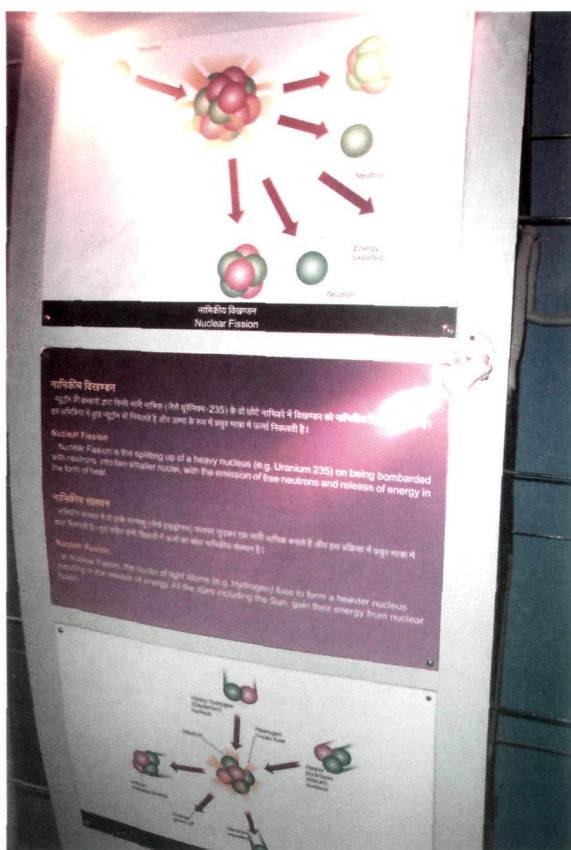
Synchronised radiation source *Indus I* developed by DAE.



The use of radiation in medicine-
Teletherapy (top) and
brachytherapy (bottom) for
treatment of cancer.

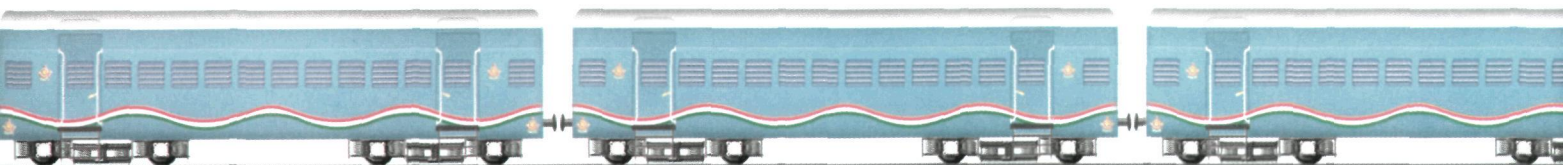


Diagrammatic
representations
of nuclear
fission (top) and
nuclear fusion (bottom)



Divided into six sections, the exhibits of DAE highlighted the range of activities it had been undertaking. Starting with the birth and the mandate of the DAE, the first section provided the visitor basic information on the structure of the atom, isotopes, radiation, and nuclear fission and fusion. Exhibits on harnessing nuclear fission for generation of electricity highlighted the nuclear power programme and the safety aspects related to nuclear power stations. Following this there were exhibits on research reactors, production of radioisotopes and their applications in healthcare, especially diagnosis and treatment of cancer and other diseases. Other exhibits highlighted the applications of radioisotopes in agriculture and food preservation. The next section displayed the work on applications of radioisotopes in industry and hydrology and the activities in the area of desalination. The last section was devoted to advanced technologies like accelerators, lasers and supercomputers and to the work of DAE in providing eco-friendly technologies for preserving the environment.

There were panels explaining the techniques of radionuclide imaging (RNI) using gamma camera, radioimmunoassay (RIA), teletherapy with a radiation source and brachytherapy deployed in the treatment of malignant growths. The DAE's efforts to develop teletherapy machines based on gamma rays and electron accelerators were highlighted. The penetrating power of Alpha, Beta and Gamma rays was portrayed in one of the panels. Pictures of the *Cirus* and *Dhruva* reactors and nuclear power plants, besides the indigenously developed Fast Breeder Test Reactor at Kalpakkam, and the 500 MWe prototype Fast Breeder Reactor under construction at Kalpakkam



attracted the visitors. One of the exhibits apprised the visitors of the various stages of processing – from mining till production of power – through which the nuclear fuel passed.

The DAE panels also sought to depict the effect of radiation from nuclear plants in the correct perspective. One of the panels on the composition of the total radiation exposure of the population highlighted the fact that 67.6% of total radiation exposure of the population came from natural background, 30.7% from medical radiation, and only 0.15 per cent from nuclear industry. The steps taken to preserve the environment around nuclear installations were explained in one of the exhibits.

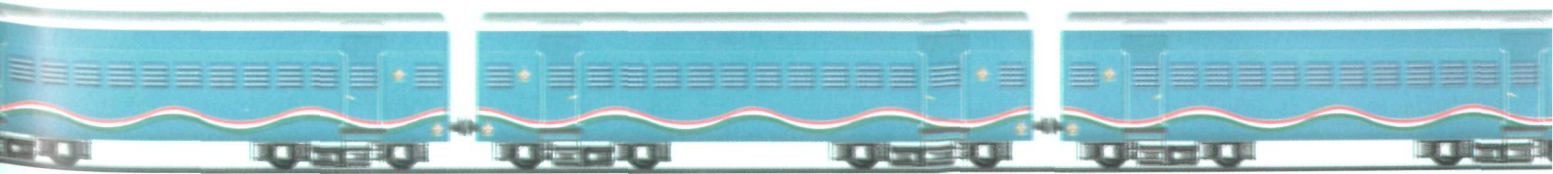
Application of radioisotopes in protecting coastal environment, the iso-count contours of a radiotracer investigation at Colaba Outfall off Mumbai coast, radiation sterilization plant, radiation sterilization kits for use by traditional birth attendants called *dais*, blood irradiator, application of nuclear science in agriculture to develop improved mutant varieties of different crops using gamma radiation, tissue culture and radiation processing of food products were highlighted.



Advanced technologies developed by DAE. Synchronised radiation source Indus II (top); dye laser (bottom)



Tissue culture production of banana multiple shoots in liquid nutrient medium (top); synthesised pheromones for insect control developed by DAE (middle); ladybird beetles being used for pest control (bottom)





Panels highlighting the achievements of Department of Information Technology.



The new age of technology for telecommunication.

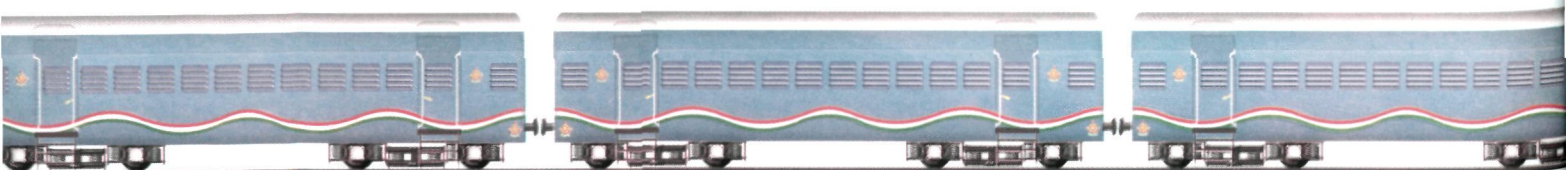
COACH
4

Strides in ICT

MINISTRY OF COMMUNICATION AND INFORMATION TECHNOLOGY

While nuclear science held the centre-stage in the middle of the 20th century, the last two decades of the 20th century witnessed significant advances in information and communication technologies (ICT) around the world. These have brought the nations in the world and the cities within a nation closer. Not one to lag behind, India has taken a number of initiatives to make the country an ICT superpower. This is not surprising because India has trained manpower and a long history in the field of communication dating back to 1850 when the first electric telegraph line was commissioned between Calcutta (now Kolkata) and Diamond Harbour. Since then the telecom revolution has continued unabated, connecting the teeming millions with different means of communication—telegraph, telephone, wireless radio, and now computers and Internet. The fascinating story of the telecom journey and information revolution was portrayed jointly by the Centre for Development in Telematics (C-DOT), Department of Telecommunications (DoT) and the Department of Information Technology (DIT), both under the Ministry of Communication & Information Technology.

The DoT exhibits traced the history of communication from the primitive days when messages were sent from one place to another through marathon runners. Subsequently, horse-riders and pigeons were used to send messages. Then came the fire signals used in the Greek and Roman empires during wars, and torch telegraph. The dawn of instant communication came with the



invention of Morse telegraphy followed by the invention of telephone by Alexander Graham Bell, and of radio by Marconi. The last few decades of the 20th century witnessed further developments in the form of communication satellite, fibre optic cables, cellular telephone, and Internet. Besides highlighting all these milestones in the evolution of telecommunications the exhibits by DoT also portrayed the steps taken in India by the government and public sector enterprises like BSNL, MTNL and TCIL to harness the latest in communication technology and bring about nationwide connectivity. Photographs of vintage telephone instruments and diagrams of string telephony provided an added attraction.

The panels put up by DIT sought to project the steps taken to make the country a super-power in the sphere of Information & Communication Technology. The products developed by Centre for Development of Advanced Computing (C-DAC), including supercomputer, multi-lingual office automation solutions, digital library solutions, and integrated telemedicine solutions brand-named Mercury, were displayed in these panels. The initiatives taken to make India a global destination for R&D and promote e-governance were also highlighted by the DIT. The exhibits included a map explaining the level of connectivity achieved through the NICNET and a panel detailing the socio-economic benefits resulting from the advances in ICT.

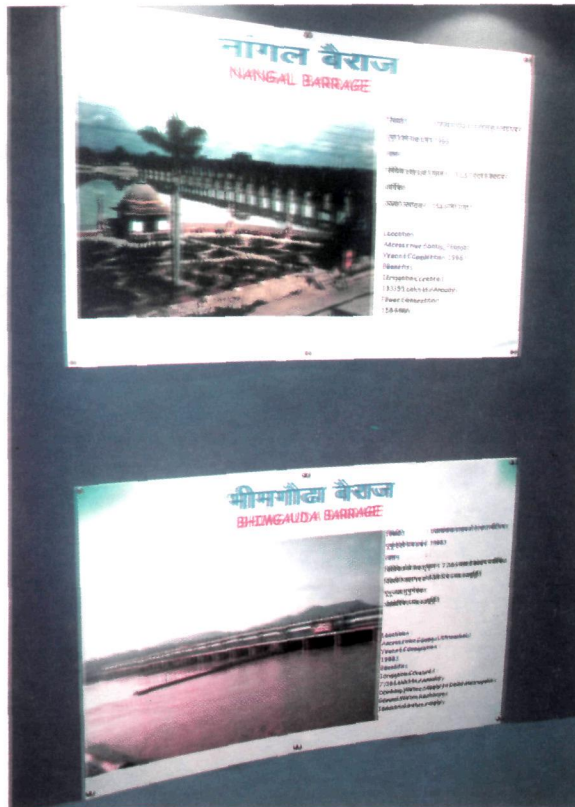
From the Archives... अभिलेखों से...



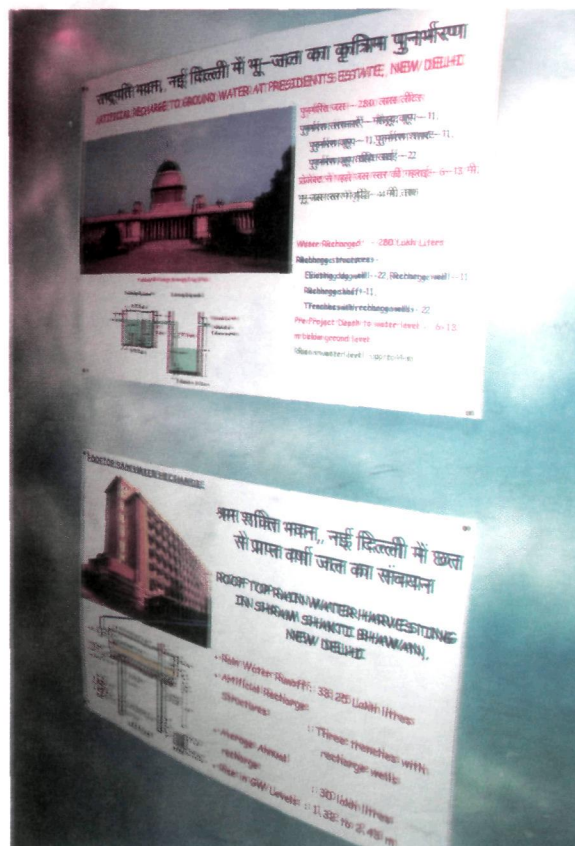
Vintage telephones (top); a general view of the Ministry of Communication and Information Technology display (bottom).



Photographs of Nangal Barrage and Bhimgaunda Barrage.



Panel on top explains artificial recharge of ground water and panel at the bottom explains roof top rain water harvesting.



COACH
5

Water Resources and Ocean Development

MINISTRY OF WATER RESOURCES AND
DEPARTMENT OF OCEAN DEVELOPMENT

As one moved to the next coach one got an idea of the potential of water to meet the growing energy needs of the country. The panels put up by the Central Water Commission (CWC) and the Department of Ocean Development (DoD) highlighted the steps taken to tap the rich water resources of the country available in the rivers and the ocean. Pictures of Nangal, Bhimgaunda, Farakka, and Kosi barrages, Indira Gandhi Nahar Project, Gandhisagar Dam, Idukki Project, and Hirakud project attracted the visitors. The initiatives taken to promote groundwater recharging and rainwater harvesting were depicted through pictures of Rashtrapati Bhawan and rooftop rainwater harvesting in Shram Shakti Bhawan, in which the Union Labour and Power Ministries are located in New Delhi. The Rashtrapati Bhawan project helped to recharge 280 lakh litres and the water level had risen by 4 metres. An irrigation map exhibited here helped the visitor in understanding the potential and the extent of exploitation of water resources for irrigation and drinking water supply in our country.

The panels put up by DoD sought to highlight the resources lying under the ocean and the efforts to tap them. Pictures of ornamental fishes, polymetallic nodules and coral reefs attracted the visitors. One of the panels portrayed the *Sagar Kanya*, the specially designed ship used for scientific expeditions. The series of expeditions to

Antarctica and the nature of the studies undertaken on human adaptation in Antarctica were also depicted. The National Data Buoy Programme, the data buoy observations during the Arabian Sea cyclone and exploration of ocean depths for drugs were among the interesting exhibits.



The technology and systems used for mining of mineral resources from the sea floor and specimens of polymetallic modules recovered from Indian Ocean floor.

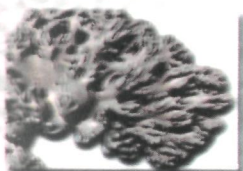
DRUGS FROM THE SEA



Name: Echinodermata - Echinoidea
Family: Echinoidea
Biological Activity: Anticancer
Distribution: Coastal Waters



Name: Ulva - Rhodospirillum rubrum
Family: Rhodospirillum rubrum
Biological Activity: Anticancer
Distribution: Coastal Waters

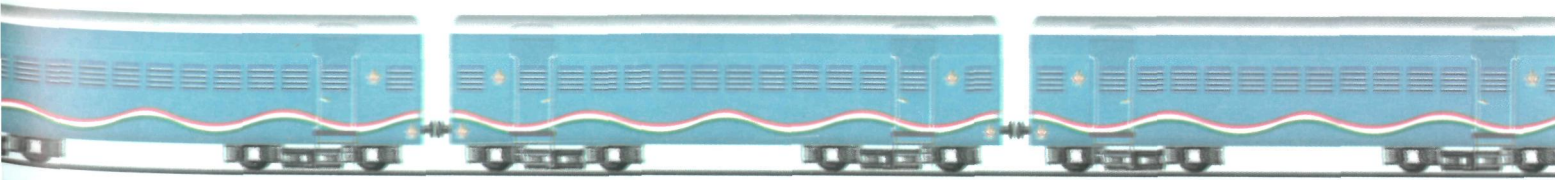


Name: Spongia (Spongia)
Family: Spongia
Biological Activity: Anticancer
Distribution: Coastal Waters



Name: Echinodermata (Echinoidea)
Family: Echinoidea
Biological Activity: Anticancer
Distribution: Coastal Waters

A model of the *Sagar Kanya*, a specially equipped ship used in oceanographic research.





COUNCIL OF SCIENTIFIC AND INDUSTRIAL
RESEARCH

The immense contribution made by the CSIR in the area of drugs and pharmaceuticals was also highlighted. Eleven out of 14

drugs developed in Independent India were from CSIR laboratories. These included oral pills for birth control and an anti-malarial drug. When natural disasters like earthquakes occurred the CSIR laboratories were in the forefront in providing relief and rehabilitation to the victims in different ways. In the field of aviation its contribution lay in the development of two-seater trainer aircraft, named *Hansa* and a 14-seater aircraft named *Saras*.

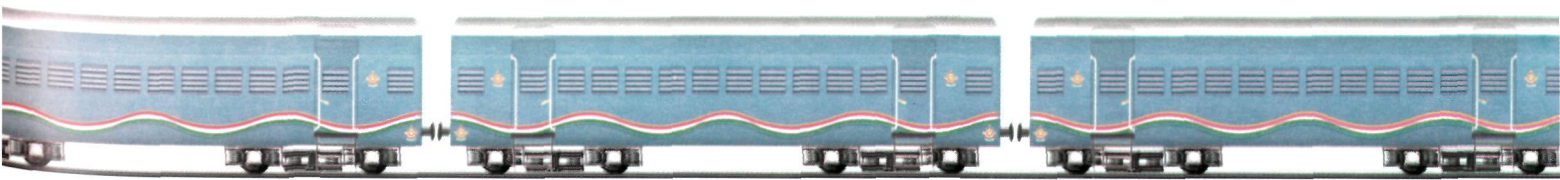
The contribution of CSIR in increasing food production was no less significant. The 20-HP tractor, brand-named *Swaraj*, was developed by one of the national laboratories in the 1970s and manufactured by the public sector Punjab Tractors Ltd. More than one lakh *Swaraj* tractors are now in use, which brings out the popularity this tractor enjoyed among the farmers. More recently the CSIR had come out with a 60-HP tractor named *Sonalika*.

Some of the other contributions highlighted were the breakthrough in bamboo flowering by tissue culture, use of DNA fingerprinting to unravel identity, safety measures in coal mines, light combat aircraft, aerospace testing facilities, and super computing facilities. In the 1980s our country was starved of computing power as the supercomputers made in the West were either too expensive or were not sold to India. Indian scientists took it as a challenge to build indigenous capability and connected several sequential computers in parallel. The result was the "Flosolver", India's first parallel computing facility, which hit the market in 1986. Its success triggered the development of other parallel computing products such as PARAM by C-DAC. The visitors to CSIR display got an idea of the



A general view of the CSIR display.

Model of the *Saras* aircraft developed by CSIR.





Coal upgradation plant developed by CSIR.

Hansa-3, India's first all-composite two-seater trainer aircraft developed by CSIR.



indigenous S&T capability developed in diverse areas and the initiatives taken to build a pool of expert S&T manpower through fellowships and training programmes. India is now the single largest global source for experts in leather and food processing technology.

Another success story highlighted related to the development of mint plants with high oil content. As a result, the farmers in Terai region of Himalayas are literally minting money. Improved varieties of mint developed by CSIR laboratories were being cultivated on 40,000 hectares of land in this region by nearly 20,000 farmers. India has emerged as the largest exporter of menthol mint and its oil, displacing China to the second position. The CSIR has also helped to revive the tea industry in Himachal Pradesh. The activities of CSIR scientists extended to the oceans where they were exploring for strategic minerals. The visitors also got an idea of the success of the Millennium India Technology Leadership Initiative, which sought to make our country a world leader in selected fields of technology.



COACH
7

Defence Research and Development

DEFENCE RESEARCH AND DEVELOPMENT ORGANIZATION

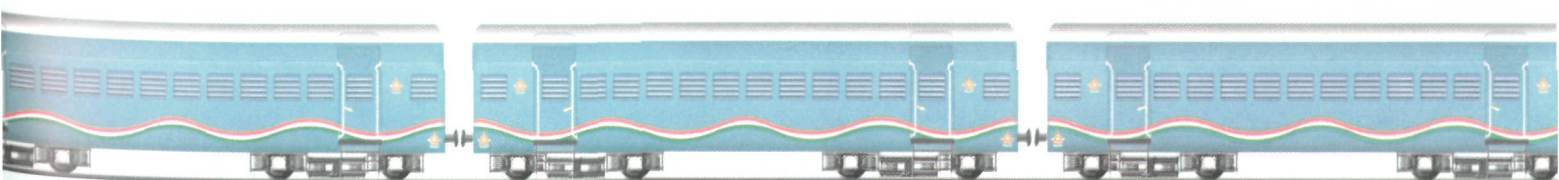
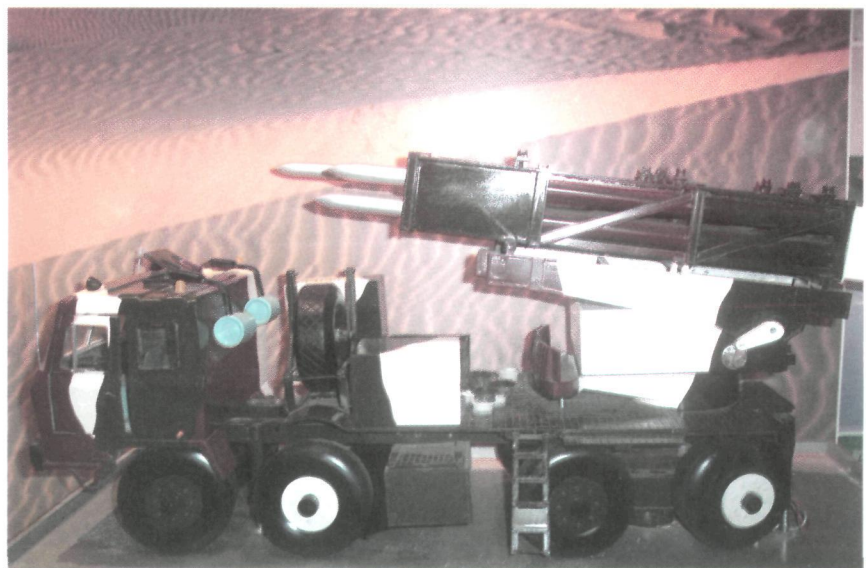
While the CSIR focussed its R&D efforts on topics of relevance to the community at large, the Defence Research and Development Organisation (DRDO) concentrated its efforts on enhancing the military might of the country. The DRDO had its beginning in 1948 as Defence Science Organisation, with a few basic science laboratories working in service disciplines and was restructured as DRDO in 1958. Since then it has grown into a dynamic, multi-disciplinary, national scientific agency with over 50 well-equipped research establishments spread all over the country engaged in a wide spectrum of R&D activities to make the nation self-reliant in critical technologies of relevance to national security. Its R&D work covered frontier areas of aeronautics, armament, high-energy explosives and propellants, combat vehicles, combat engineering equipment, communication systems, electronics and instrumentation, missiles, Naval technologies, radar, robotics, artificial intelligence, avalanche prediction and control, high-altitude agriculture and food preservation. The exhibits of DRDO turned out to be a star attraction for the visitors.

The DRDO display began with the photographs of eminent scientists who were at its helm since its inception and a map showing the location of its research establishments. Then followed the models of different equipment developed indigenously. These were the Main Battle Tank *Arjun*, the world-class multi-hop bridging system *Sarvatra*,



Model of the Agni missile

Model of a missile carrier developed by DRDO.

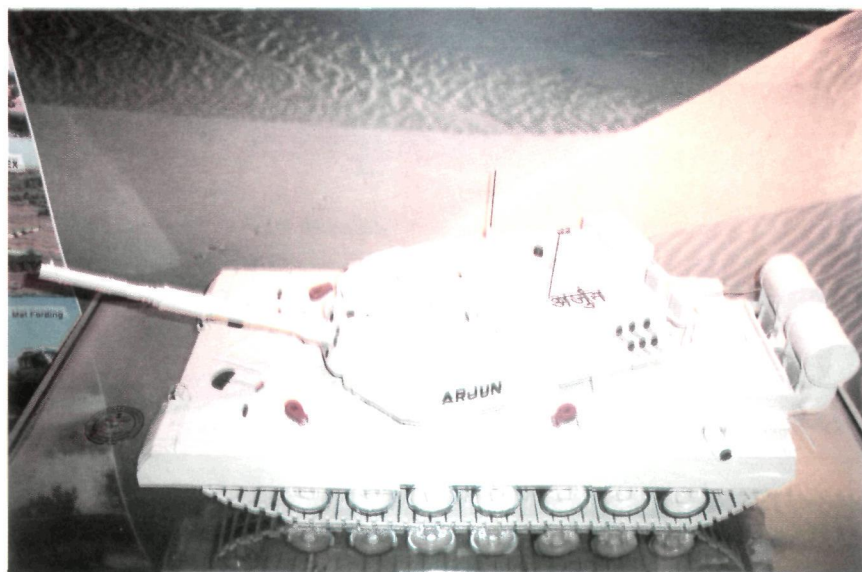




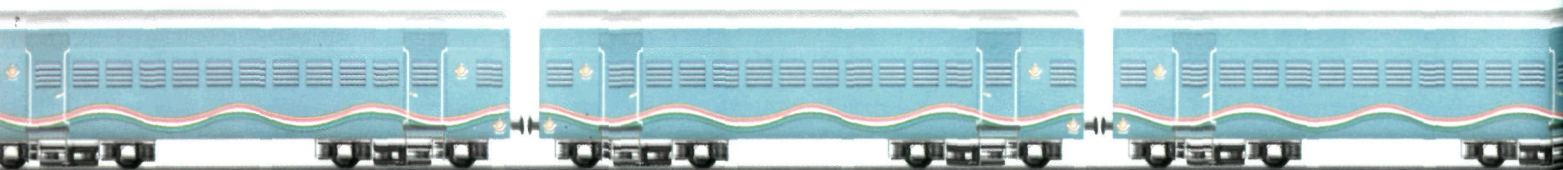
A general view of the DRDO display.

the multi barrel rocket system *Pinaka*, the missiles *Nag*, *BrahMos*, *Prithvi*, and *Agni*, the pilotless aircraft *Nishant*, the world's smallest light combat aircraft *Tejas*, the battlefield surveillance radar, torpedo, extreme cold weather clothing and processor based ground mine. The models evoked considerable interest among the visitors. One of the panels presented the titanium dental implants developed by the Delhi-based INMAS and Hyderabad-based Non-ferrous Technology Development Centre.

Model of Main Battle Tank, *Arjun*, which attracted the visitors very much.



Model of the *Prithvi* missile.



COACH
8

Renewable Energy

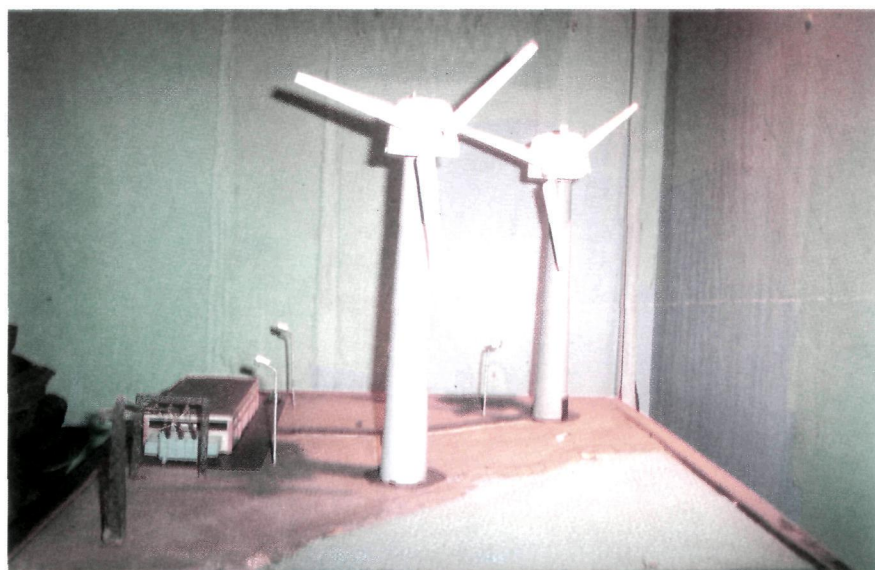
MINISTRY OF NON-CONVENTIONAL ENERGY SOURCES

After getting an idea of the contribution of defence scientists towards national security, visitors got a feel of the steady progress being made in the country to achieve energy security by tapping non-conventional sources such as Sun, wind, water, farm wastes and municipal wastes. Put up by the Ministry of Non-conventional Energy Sources (MNES), the panels depicted the renewable energy products and projects. These included systems to tap wind energy, small hydro resources, solar photovoltaic systems for water pumping, power generation, lighting, solar cookers, solar water heating systems and biogas plant. Integrated use of these different sources for meeting diverse needs of a village was also depicted. One of the panels depicted a mega solar cooking system installed by Tirumalai Tirupati Devasthanam to cook two meals a day for 15,000 pilgrims. Another depicted the solar water heating system installed in a residential colony in Pune.

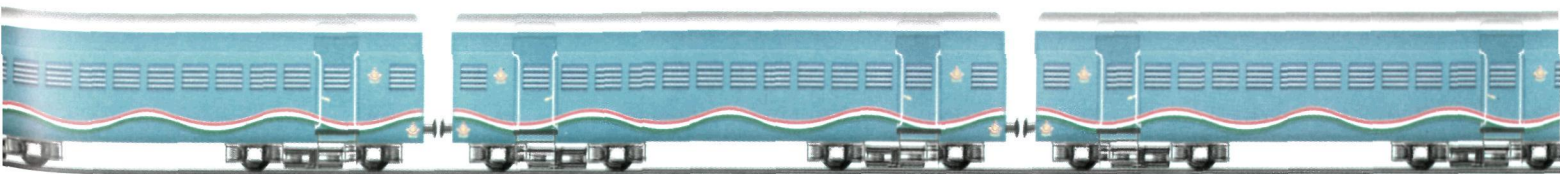
The significant strides made in tapping biomass and wastes, both urban and industrial, were also projected. The exhibits included models and panels depicting biomass power generation plant, power generation from urban and industrial wastes, exploitation of hydrogen energy, vehicles powered by battery and fuel cell-battery hybrid, motorcycle based on hydrogen energy and commercial wind farm. Besides giving the visitors interesting information on the renewable energy systems developed indigenously the exhibits also highlighted the increasing share of renewable energy



Model of a biogas plant



Model of a wind mill

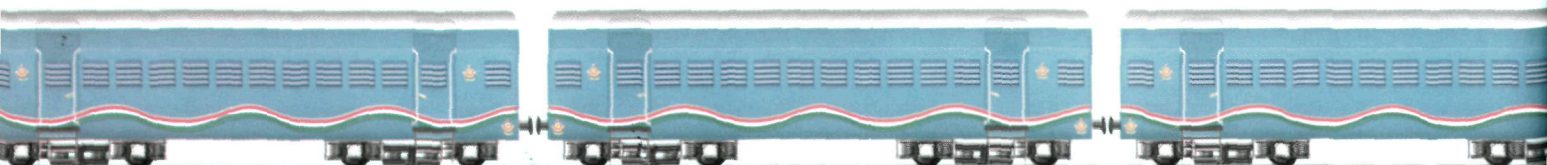




A general view of the MNES display

sources in total power generation, their contribution in meeting the decentralised energy requirements and the exclusive Adithya Shops in different States where one could buy them.

Model highlighting the integrated deployment of different renewable energy sources including solar, wind, and biogas



COACH
9

Green Revolution

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

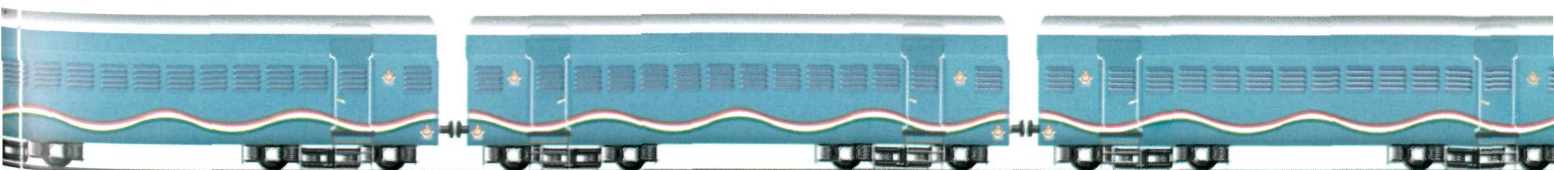
In the next coach the Indian Council of Agriculture Research (ICAR) displayed exhibits highlighting its contribution not only in making the country self-sufficient in food production but also in increasing the production of milk, fruits and vegetables, and fish, through development of improved technology for production and processing. The panels highlighted the importance accorded to food production since the Vedic period and depicted the contributions made by Indian farm scientists in developing improved varieties of wheat and rice and increasing the production of coarse cereals. The Durrum wheat and Sunhara scented rice were among the improved varieties exhibited.

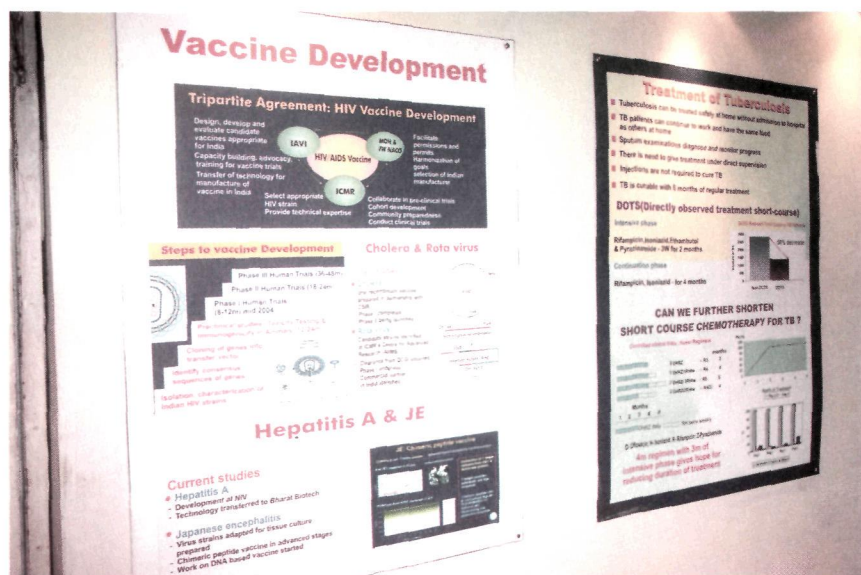
Much of the increase in food production had been due to the improved farming techniques, agriculture machinery and high-yielding varieties developed by the ICAR. These included the technique of zero tillage and hybrid rice variety. The development of hybrid rice helped to reverse the trend of yields reaching a plateau. Similarly, the development of livestock with new strains of crossbred cows and steps to control the Rinderpest disease, which affected cattle, made India occupy a leading place in the world in milk production. Besides highlighting this, the panels brought out the significant contributions made by ICAR scientists in poultry, fisheries and horticulture. The visitors were informed that India was now globally one of the largest producers of fruits and vegetables and that fresh fruits from India were very much in demand in foreign countries. The strides made in research in lac, soyabean and oyster pearl culture were also highlighted.



Various soya products with high nutritional value

ICAR activities in the area of fisheries development





ICMR has been engaged in development of vaccines against HIV, Cholera, Hepatitis A and Japanese Encephalitis. These are highlighted in this Panel.

Byssinosis, a lung disease caused by inhalation of cotton dust.

SYMPTOMS

Breathlessness & chest tightness on the first day of the week after weekend break - Monday sickness.
Prevalence of byssinosis is about 40% in card room and blow room workers in textile mills.
Byssinosis is a notifiable and compensable disease, under the Factory's Act.
Prevention: Reduction of cotton dust using local exhaust.

BYSSINOSIS

A lung disease caused by inhalation of mainly cotton dust.

An association exists between byssinosis and endotoxin of Gram Negative Bacteria.
Airborne GNB & their endotoxins are high in card room & blow room of the cotton textile mills.

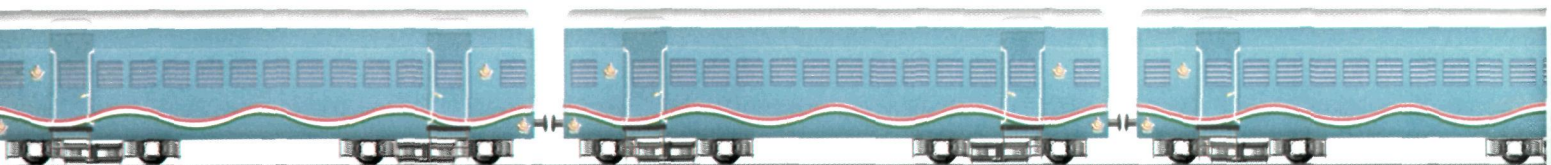
COACH
10

Health for All

INDIAN COUNCIL OF MEDICAL RESEARCH

A healthy and disease-free life is what everyone wishes for and Indian medical scientists under the banner of Indian Council of Medical Research (ICMR) have over the years made significant contribution towards this goal. Established in 1911 as Indian Research Fund Association, the ICMR got its present name in 1949 in the wake of Independence. Through a network of research institutions set up in different States the ICMR had been striving to improve the state of public health and tackle a variety of diseases afflicting the people. The informative exhibits put up by ICMR provided the visitors a glimpse of the initiatives taken towards the development of vaccine for HIV/AIDS, hepatitis and Japanese encephalitis. The technology for the hepatitis vaccine developed by ICMR scientists has been transferred to Bharat Biotech for commercialization. Development work on the Japanese encephalitis is in an advanced stage. The other diseases focussed upon by ICMR were malaria, tuberculosis, leprosy, jaundice, dengue, and silicosis, byssinosis and other occupational hazards.

The panels highlighted the studies on distribution of malaria cases, malaria vectors and the control measures developed. In the case of tuberculosis the exhibits explained the causes of the disease and the different treatment protocols developed. The panels on leprosy highlighted the importance of early detection and uninterrupted treatment. The ICMR's work in the wake of natural calamities, like earthquake and outbreak of diseases on a mass scale, was also highlighted. These covered the investigations



into Kyasanur Forest Disease, mustard oil contamination in Madhya Pradesh, and diarrhoea in some parts of Kolkata. In the field of occupational health the panels explained the studies undertaken by National Institute of Occupational Health in respect of human-machine interface, human-environment interface, user-system interface and human-organization interface.



A general view of ICMR display.

Workers engaged in Quartz crushing, Agate grinding, Slate pencil, Stone quarries, Ceramic industries, etc. are at high risk of silicosis.

Slate pencil cutter

Dust Control Implemented

Prevalence of Simple Silicosis (54.6%), Progressive Massive Fibrosis (17.7%) in Slate Pencil Industry.

Agate Workers

Agate Stones & Articles

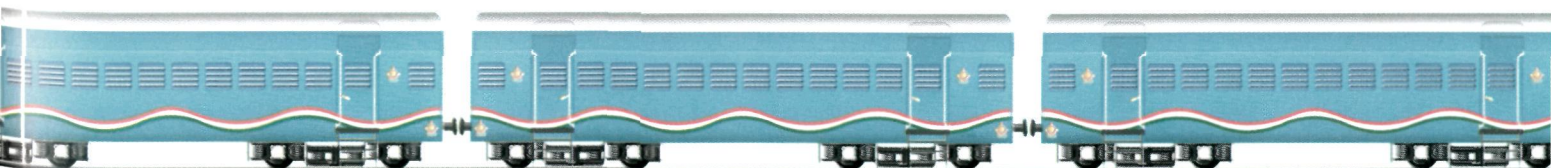
Intervention to control airborne silica dust in the work environment helps to reduce the risk of the disease. New Exhaust System incorporated in the grinding machines significantly improved in controlling dust levels.

SILICOSIS

A crippling and often fatal lung disease due to deposition of silica dust

National Institute of Occupational Health
Under an Council of Medical Research
Mugheri, Ahmedabad 380 016

Silicosis, a disease caused by airborne silica dust. Both Silicosis and Byssinosis are occupational diseases being studied by the National Institute of Occupational Health under ICMR.



Model of the geosynchronous satellite launch vehicle, GSLV



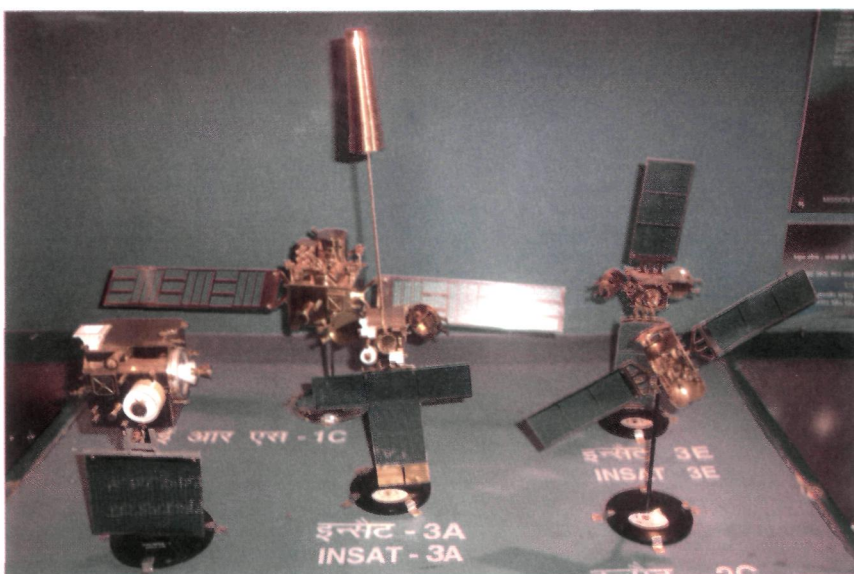
COACH
11

Into Space

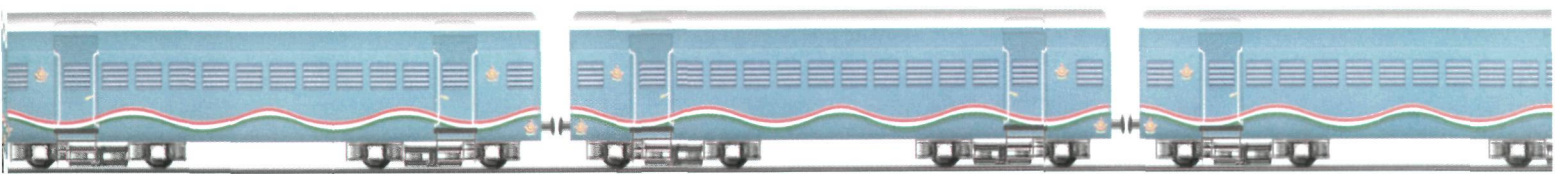
INDIAN SPACE RESEARCH ORGANIZATION

The Indian space programme has emerged as one of the most prominent scientific and technological successes in the post-Independence era. The strides made in the development and application of space science and technology for the benefit of the community were highlighted by the Indian Space Research Organisation (ISRO). ISRO was formed in 1969 under the Department of Atomic Energy and later, when the Department of Space was created, it was brought under it. The 1970's and Early 1980's marked the era of experimentation during which satellites like *Aryabhata*, *Bhaskara*, *Rohini* and *APPLE* were built and launched. Demonstrations of space applications like Satellite Instructional Television Experiment (SITE), the Satellite Telecommunication Experiment Project (STEP) and experimental projects in remote sensing were also launched. The success of these programmes paved the way for commissioning space systems in the 1980s when the multipurpose *INSAT* system for telecommunication, television broadcasting and meteorology, and the Indian Remote Sensing Satellite *IRS* for resources monitoring and management were established. The Indian space programme became self reliant with the commissioning of its launch vehicles Polar Satellite Launch Vehicle (PSLV) and Geosynchronous Satellite Launch Vehicle (GSLV) for launching spacecraft into polar orbits and geo-synchronous transfer orbits respectively.

Models of satellites designed and built by ISRO



The display by ISRO vividly portrayed the milestones in the Indian space programme. The panels depicted the gen-



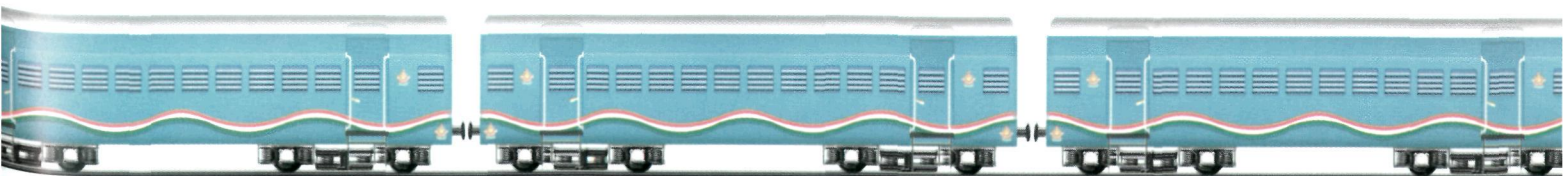
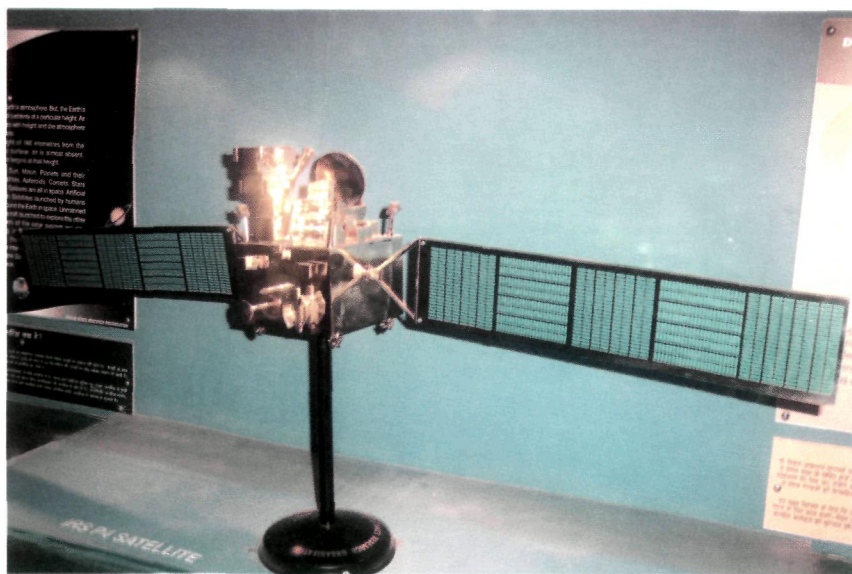
esis and organisation of India's space programme and the space systems like *INSAT* for different applications, the *IRS* series of remote sensing satellites, and the launch vehicles like PSLV and GSLV. Big pictures and scale models of launch vehicles and satellites attracted the visitors, especially from remote areas, who have no other means of learning about these developments. A significant feature of the display was that it also sought to explain to the visitors the nuances of space technology like the functioning of rockets and satellites, types of orbits, rocket propellants, etc. The exhibits also provided the basic information on the satellites developed for different applications like communication, meteorology, disaster warning, etc. One of the panels provided information on India's scientific mission to Moon, *Chandrayan-I*. A demonstration model explained the concept of geosynchronous and polar orbits. There was an interesting panel presenting the pictures received from the meteorological satellite *Kalpana-I*.



Visitors going round the space exhibits

One of the panels explained with illustrations the different applications of *INSAT*. The *INSATs* are used for TV broadcasting and radio networking, providing access to television for 850 million people through more than 1,000 transmitters. Other applications included telemedicine connectivity to provide super-speciality medical services in remote and rural areas, telecommunications, search and rescue, social development through exclusive channels for education and training, and cyclone warning services through receivers set up along the coast. All these were quite educative and informative.

Model of the Indian Remote Sensing satellite *IRS P-4*



The activities of
Vigyan Prasar –
VIPNET Clubs
and publications



A visitor trying
his hand at the
Information
Kiosk put up by
Vigyan Prasar

COACH
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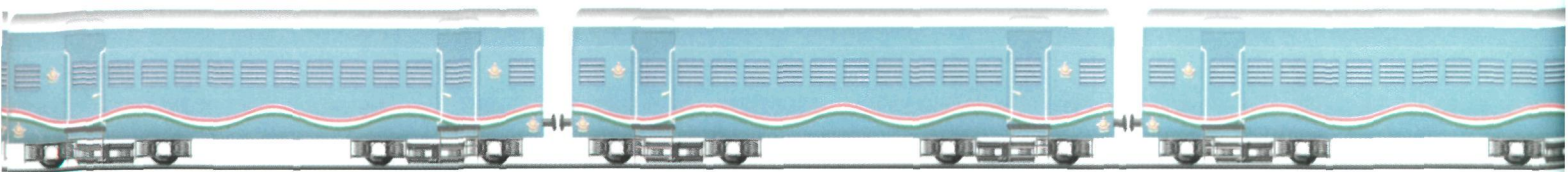
Initiatives by DST and DBT

VIGYAN PRASAR, INDIA METEOROLOGICAL
DEPARTMENT, SURVEY OF INDIA, TIFAC, AND
DEPARTMENT OF BIOTECHNOLOGY

Four agencies under the Department of Science and Technology (DST) and the Department of Biotechnology (DBT) shared the last coach. The agencies under DST projected the initiatives taken to promote scientific research and technology development, build up excellence in scientific research and generate greater awareness among the people at large about the value of science and technology.

One of these agencies was Vigyan Prasar set up as an autonomous registered Society in 1989 to take up large-scale programmes to popularise science and technology. Acting as a resource-cum-facility centre for S&T communication, it had set up 5,000 science clubs in the country under the name of VIPNET Science Clubs. It has also been producing radio and television programmes in different languages, publishing a monthly newsletter titled *Dream 2047* and organizing workshops, seminars and training programmes on a variety of scientific topics. Vigyan Prasar highlighted all these initiatives through informative panels on the national network of Science Clubs, its publications on eminent scientists and scientific phenomena, Ham radio, and kits and toys. A Science Quiz, especially designed for the visitors, was an added attraction.

The Survey of India, which is the national survey and mapping organization, is the oldest scientific agency of the Government of India dating back to 1767. Its main task is to provide base maps of the country's

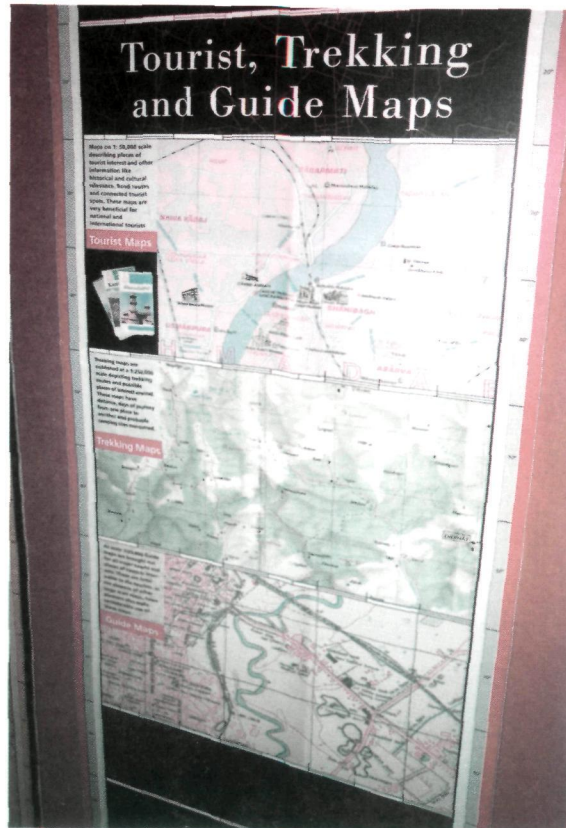


domain. Two hundred years ago it undertook the massive project called “The Great Indian Arc of the Meridian”. It was the longest measurement of the Earth’s surface ever to have been attempted. At the time of Independence the country inherited a survey network built on scientific principles. The scientific principles of surveying have been augmented by the latest technology to meet the different data requirement of planners and scientists. The panels put up by the Survey of India highlighted its mandate and activities in the area of geodesy, photogrammetry, mapping, and map production. Some of the topographic maps and guide maps of tourist and trekking centres produced by the Survey of India displayed were quite informative.

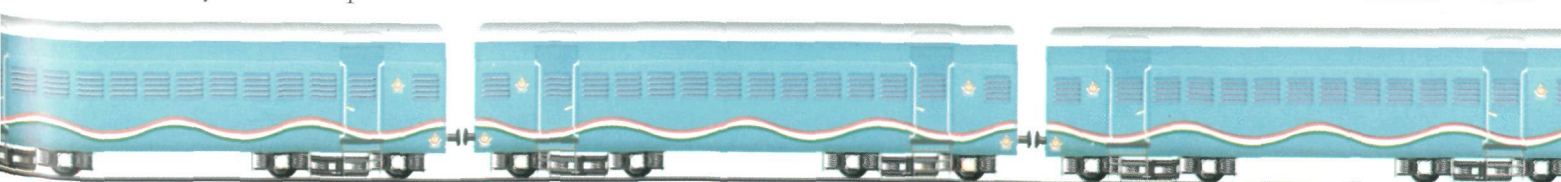


Publications of Vigyan Prasar.

The India Meteorological Department too has a long history dating back to 1875. It is charged with the onerous task of providing information on weather conditions, which had impact on a range of economic activities. The panels put up by IMD highlighted the weather forecasting services provided for different purposes and the way warnings about severe weather phenomena like cyclones, dust storms, heavy rains, snowfall, etc., were communicated to the district officers. The panels presented the Upper Air Network and a map of seismic zones and the network of seismological observatories in 1947 and in 2003. There was an interesting panel explaining every aspect of earthquakes, including the causes, and giving a list of major earthquakes that had occurred in India. There were interesting pictures received from *INSAT 1-D* showing the development of the supercyclone that started on 26th October 1999 and hit Puri coast on 29th October. The details of the studies conducted by IMD as part of the Antarctica



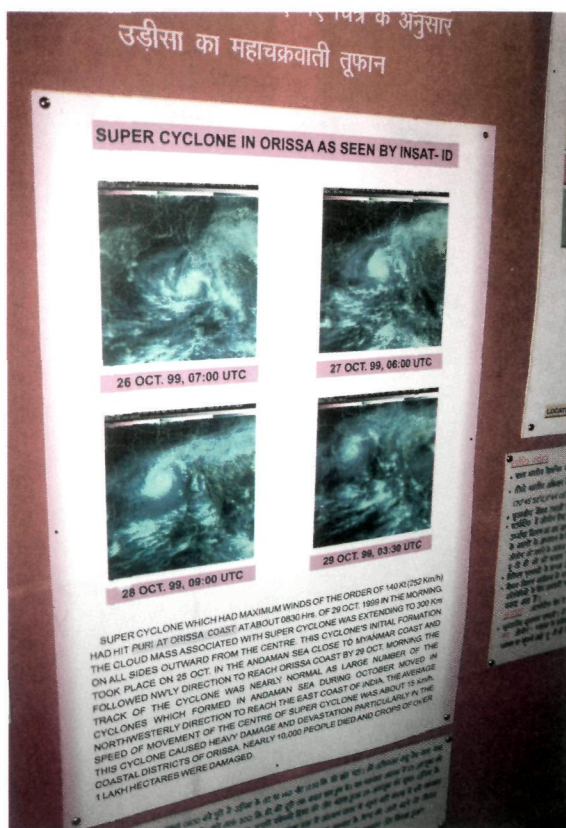
Tourist Map and a Trekking Map produced by Survey of India



A theodolite used in survey work.



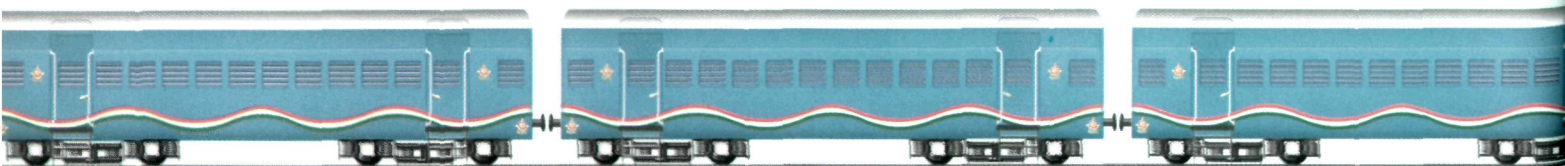
Satellite images of the Orissa Super Cyclone received from INSAT 1D at IMD.



Expedition were also depicted. One of the panels depicted the ascent of Ozone Sonde at the Meteorological Station set up at Maitri in Antarctica for ozone measurement.

The Technology Information, Forecasting and Assessment Council (TIFAC), an autonomous organization under the DST, highlighted its efforts to monitor global trends in technology developments, formulate preferred technology options for India and promote homegrown technology development activities. Over a dozen technologies in different areas developed under the TIFAC programmes were displayed. These were CFC-free refrigerant, plasma pyrolysis of bio-medical waste, SCARA-type pick-place robot, standardized natural dyes, catalytic converters for vehicles, rapid diagnostic kits for poultry and cattle, detonation spy gun for surface cutting, flammable gas sensors, synthetic friction material for clutch plates, skid-mounted hydrogen generator and high purity Omega-3 fish oil. Besides these, the TIFAC panels listed the reports brought out by it on the latest technologies and business investment opportunities to help those interested in starting business. The details of National Bamboo Mission, launched by TIFAC, were also highlighted.

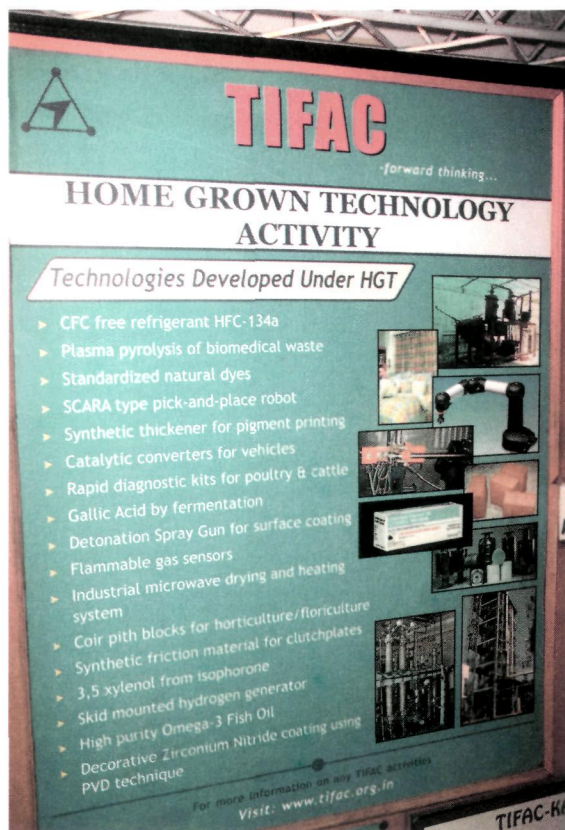
The Department of Biotechnology, set up in 1986, has been instrumental in giving a fresh impetus to the development of modern biology and biotechnology in India. It has set up autonomous institutes in frontier areas of modern biology and two public sector enterprises. It has also set up a strong infrastructure network for biotechnology research across the country and has been promoting post-graduate programmes in



biotechnology in various universities. All these initiatives were presented in the panels put up by DBT. The exhibits sought to educate the visitors about biotechnology, the progress made in India in biotechnology and its importance in various fields of human activity.

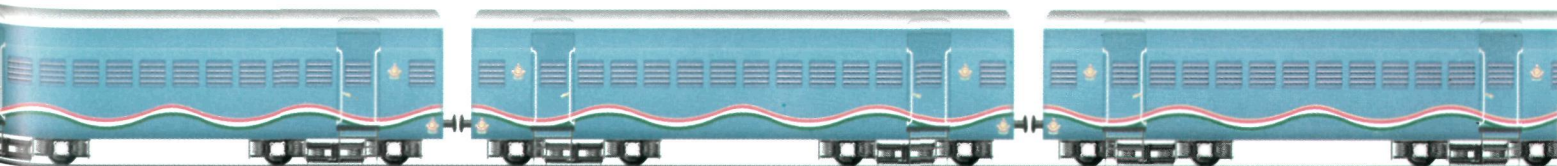
A model of DNA double-helix structure gave the visitors an idea of one of the foremost discoveries made in 1953 by James Watson and Francis Crick, which won for them the Nobel Prize. One of the panels depicted the supercomputer facility set up at IIT Delhi to carry out molecular simulation *in silico* and research in genes and proteins. Another panel explained micro-propagation for production of large number of plants identical to the mother plant under sterile conditions. The development of “oil zapper”, a bacterium for degrading crude oil and oily sludge and thereby reclaiming lands contaminated by oil spills was presented through another exhibit. Also on display were pictures of the contaminated land before and after reclamation along with list of oil companies, which had benefited by this development. Another display related to the cost-effective technology, using grass, woody species and their associated rhizospheric microbes, for restoring desertified areas of mined areas.

Among the other programmes highlighted were promotion of bio-reserves in Himalayan, North Eastern, Coastal and Island eco-systems and desert region; the setting up of a Butterfly Park in Bangalore to sensitize the people on the importance of our rich biological wealth; and development of edible vaccines that would make it easy for children to get inoculated and obviate the need for cold chain to store the vaccines.



Technologies developed under TIFAC's Home Grown Technology Activity

Models of greenhouse and shade area at the DBT-sponsored Micropropagation Technology Park at TERI, Delhi.



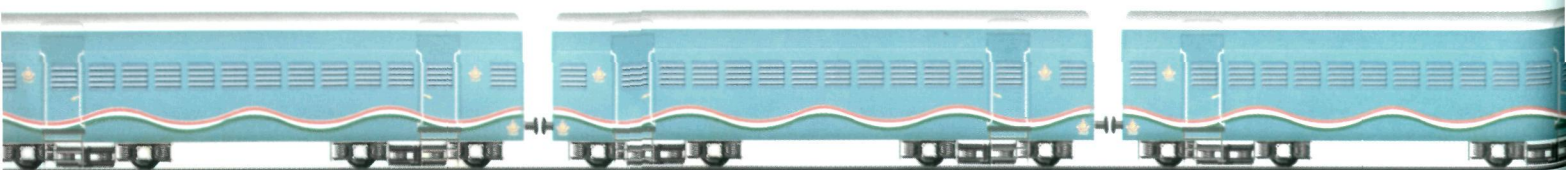
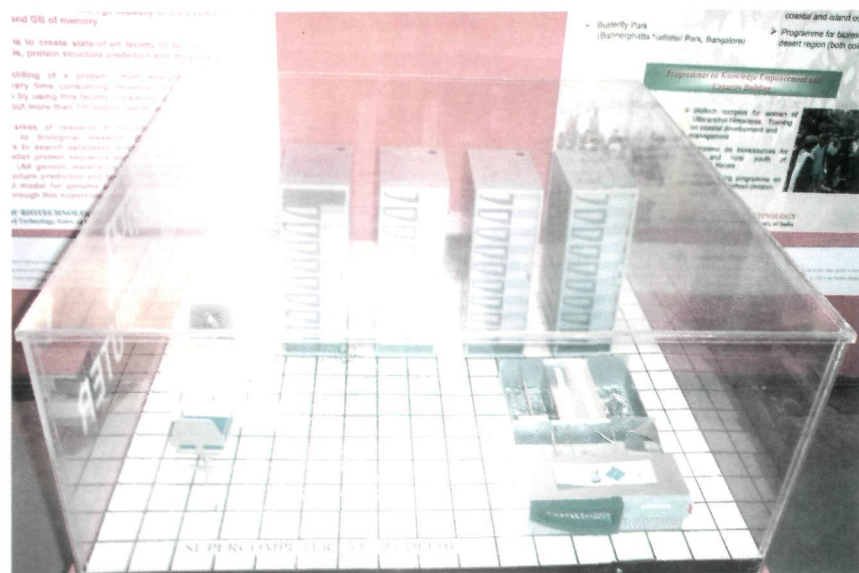


Model of the DNA double helix (left); list of Institutions under DBT (right).

One of the panels was quite informative on various aspects of diabetes and malaria and their treatment. This panel listed the efforts being made to develop new insulin delivery systems – oral, nasal and dermal – besides stem cell therapy for diabetes. Another panel depicted a model bio-village being developed in Gujarat and the Biotechnology Park for Women in Tamil Nadu. A model of a bioreactor, a multipurpose fermentor used for production of life saving antibiotics and antibodies and treatment of biodegradable waste, was a centre of attraction.

A model of a bioreactor for culturing microbial consortium put up by Department of Biotechnology (DBT).

A model of supercomputer facility set up by DBT at IIT Delhi to carry out molecular simulation *in silico* and research in genes and proteins.



THE JOURNEY

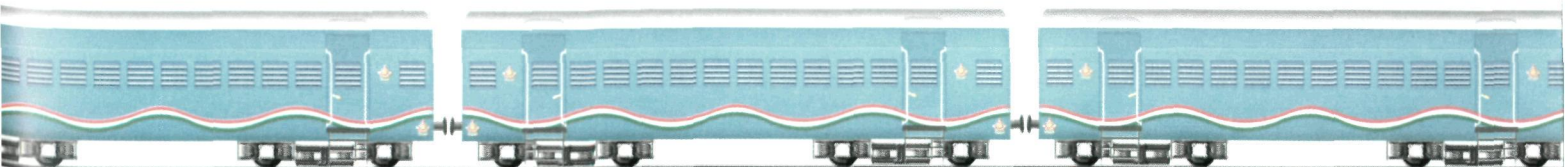
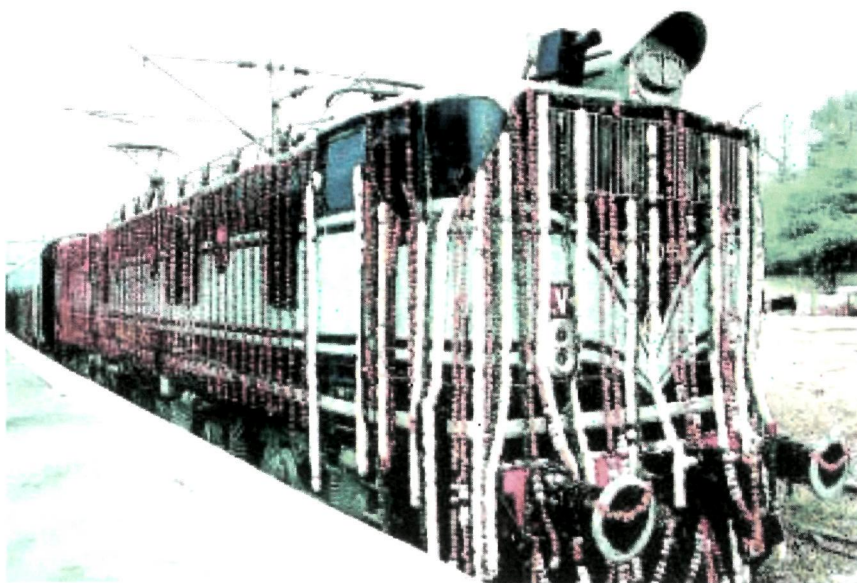
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December 15, 2003. The Safdarjang Railway Station on the Capital's Ring Railway network was as usual, crowded with office-going commuters. But for a change, it wore a festive look on that day with flowers and festoons. A host of VIPs had turned up not to board any train or send off any VIP but to witness a unique train being flagged off. It was indeed unique because it did not carry passengers or commodities but exhibits on the country's scientific heritage and progress over the years. The purpose was not just to publicize the achievements but also to promote public awareness of what science and technology had done, and could do, for the welfare of society at large.

Braving the severe winter cold the invitees, numbering nearly 2,000 including 500 school students, cheered profusely as the Prime Minister Shri Atal Behari Vajpayee flagged off the florally decorated blue-coloured special train on its journey round the country on a unique mission. As the Prime Minister rightly underlined, the occasion assumed added significance because the Ministry of Science and Technology had declared 2004 as the Year of Scientific Awareness. "India could achieve a bright future only when a majority of her population developed a scientific temper", Shri Vajpayee remarked quoting the country's first Prime Minister Jawaharlal Nehru.



Shri Atal Vihari Vajpayee, Former Prime Minister, flagging off Vigyan Rail at Delhi Safdarjung station on December 15, 2003.





A section of dignitaries at the inaugural function.

Shri Arun Kumar, Dy. Commissioner, inaugurating Vigyan Rail at Chandigarh.



Development of scientific temper was the aim of the Vigyan Rail project, a joint venture of the Ministry of Science and Technology and the Ministry of Railways, actively supported by different scientific departments and agencies.

Dr Murli Manohar Joshi, Minister for Human Resource Development and Science and Technology, Shri Nitish Kumar, Minister of Railways, Shri Bachi Singh Rawat, Minister of State for Science & Technology, Shri Baswangouda Patil, Minister of State of Railways, and Shri M. V. Kamath, President, Vigyan Prasara Society received the Prime Minister. Dr. Joshi explained the underlying concept of the Vigyan Rail project, while Shri Nitish Kumar detailed how science was being deployed to address the concerns over rail safety.

This marked the opening of the unique Exhibition on Wheels, but not the start of the journey round the country, which took place only a week later. This interregnum provided an opportunity for the Delhiites to have a glimpse of the nation's hoary past and the modern-day achievements in the field of science and technology. Residents of Delhi availed of it in full measure and there were 25,000 visitors, including students from 25 schools. Thirty volunteers from various colleges were deployed to supplement the representatives of the participant scientific departments and agencies to guide the visitors and explain to them the exhibits.

The train then began its journey on December 21 and its first halt was Chandigarh, where it arrived on the following morning to a warm welcome by the local residents led by the Deputy Commissioner Shri Arun Kumar. Significantly, the city's leading



newspaper *The Tribune* had come out with not only the news of its scheduled programme but also an editorial that morning describing the Vigyan Rail as a good initiative in spreading awareness and inculcating pride in our scientists' achievements. The Haryana Vigyan Manch and the Punjab State Council for Science & Technology had helped in arranging for the volunteers. Unlike in Delhi, where college students volunteered as guides, in Chandigarh students of Class XI and XII along with a dozen teachers volunteered to guide the visitors. During its halt for three days in Chandigarh the Vigyan Rail attracted 31,000 visitors. On the third day the number of visitors swelled to 15,000 forcing the authorities to keep it open till late in the night. According to media reports the exhibits of Defence Research and Development Organisation and Indian Space Research Organisation attracted the visitors the most.

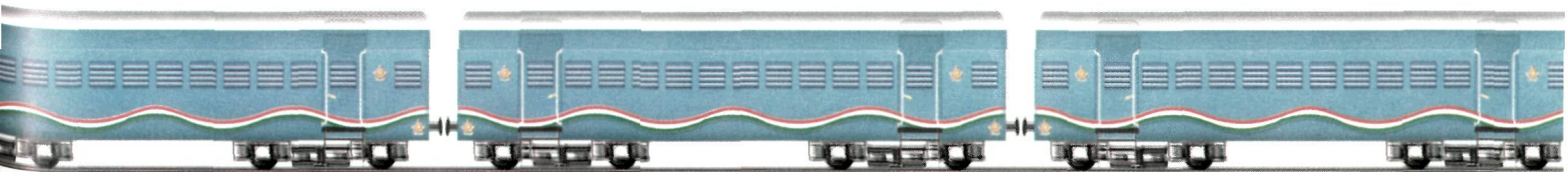
From Chandigarh the train moved to Ambala, a cosmopolitan town mostly of defence personnel. It was Christmas day and the Vigyan Rail added to the festive mood. Shri M.L.Kausik, Additional Deputy Commissioner, opened the Exhibition, which attracted 16,000 visitors over the next three days. The Haryana Vigyan Manch helped in making the arrangements for guiding the visitors and explaining to them the exhibits. Besides the local volunteers, representatives of the participating scientific agencies were also present to satisfy the curiosity of the visitors.

From the defence station of Ambala to the pilgrim centre of Haridwar, it was not a long haul. But due to the thick fog, which is prevalent around this time of the year around this town, the Vigyan Rail reached



Students viewing the exhibits inside the train at Ambala.

Shri S. K. Maheshwari, District Magistrate, viewing exhibits inside the Vigyan Rail at Haridwar.





Smt Manisha Pawar, District Collector, inaugurating Vigyan Rail at Dehra Dun.

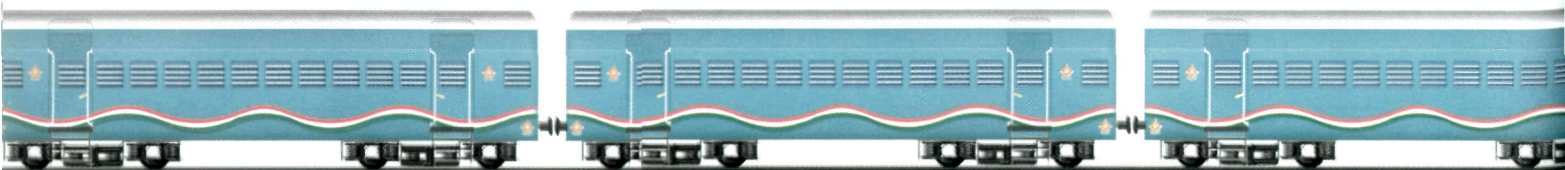
Students waiting in queue on the platform in Kathgodam to enter Vigyan Rail.



Haridwar eight hours late and by the time it entered the platform it was seven o'clock in the evening. Scores of school students with curiosity writ large on their faces waited in vain for the whole day at the station to have a glimpse of the exhibits. But, by the time it arrived, it was too late for public viewing. Only on the following morning did the District Magistrate Shri S. K. Maheswari cut the ceremonial ribbon to mark the opening of the Exhibition. Visitors not only from Haridwar but also from Roorkee, Rishikesh and other surrounding areas came in large numbers and stood in long queues braving the cold weather. An estimated 30,000 visitors of all age groups and from all sections of society saw the exhibits with great enthusiasm.

Late at night the train started on its onward journey and reached Dehra Dun, known for its cool climate and the Indian Military Academy, in the early hours of December 30. The District Magistrate Shrimati Manisha Panwar, who opened the Exhibition for public viewing, expressed the hope that it would motivate the students to take up science as their career and generate awareness among the general public about the contribution of science to society. The train was in Dehra Dun for four days and every day there were over 30,000 visitors. This reflected the interest the train had generated.

After satisfying the curiosity of the people in and around Dehra Dun the Vigyan Rail climbed up the hills to reach Kathgodam on the forenoon of January 3, 2004. Students evinced great interest and came in large numbers despite the biting cold in the hilly terrain. When the train arrived, the assembled students and general public gave a



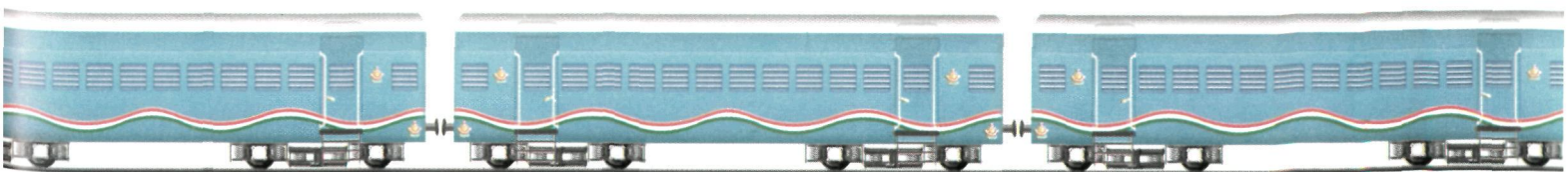
thunderous applause as Shri Mahendra Pal Singh, Member of Parliament, received it. Later, in the afternoon the PWD Minister of Uttaranchal, Shrimati Indra Hridayesh, who is also in charge of Science & Technology, opened the Exhibition for public viewing. Despite the discomfort caused by the delay in the opening of the Exhibition and the consequent long wait in the queue the visitors went through the exhibits with keen interest, making searching queries about them. The visitors included the BJP State Secretary and a former Health Minister Shri Ajay Bhat. The Exhibition attracted an estimated 30,000 visitors every day during its three-day halt in Kathgodam. For a small station in a hilly region this is quite a significant number.

From the cool hills the train moved down to Bareilly in the plains on January 6. At an impressive function on the railway platform Union Minister of State for Science & Technology, Shri Bachi Singh Rawat, opened the Exhibition for public in the presence of over 2,000 invitees. The Union Minister of State for Heavy Industries Shri Santosh Gangwar was the Chief Guest. A record number of 2.5 lakh visitors, including a large number of students, saw the exhibits during its 3-day halt in Bareilly. Two days before the train reached Bareilly, Shri Gangwar had a meeting with the heads of educational institutions in the city and sought their cooperation in ensuring that the students took the maximum advantage of the opportunity provided by the Exhibition to know about the country's progress in different fields of science and technology. Pursuant to this, students from as many as 130 schools visited the Exhibition.



Shri Santosh Gangwar, former Union Minister for Heavy Industries (extreme left), Shri Bachi Singh Rawat, former Union Minister of State for Science & Technology (second from left), and other guests looking at the exhibits at Bareilly.

Section of the crowd at the inauguration of Vigyan Rail at Bareilly.





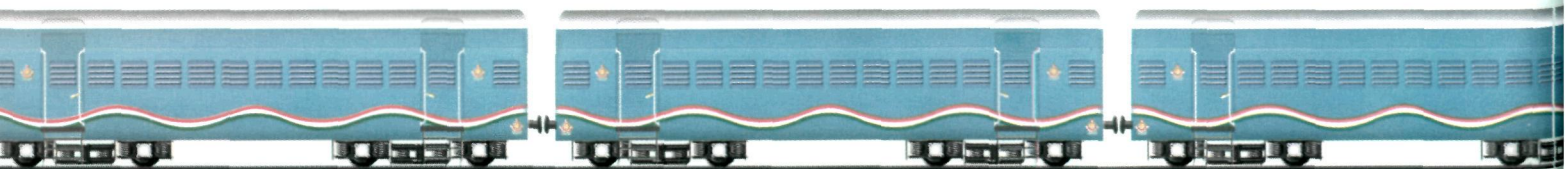
Visitors queue up on the platform at Lucknow to get into Vigyan Rail.

Delegates visiting Vigyan Rail at Lucknow (From L - R front row): Dr. C. M. Nautiyal, Scientist, BSIP; Shri R. K. Singh, DRM, Lucknow and Shri Nanith Sehgal, District Magistrate.



The next halt for the train was Lucknow, capital of Uttar Pradesh, where it reached on January 9. The morning newspapers had headlined the news of the scheduled arrival of the train and hundreds of people had gathered at the Saloon Siding of the Charbagh Railway Station to greet the train. Later, Shri R.K. Bansal, Divisional Railway Manager and Dr. Nanith Sehgal, District Magistrate opened the Exhibition for public viewing in the presence of a large gathering of special invitees, including the Director and other officers of the UP Council of Science & Technology and Dr. C.M. Nautiyal, Scientist, Birbal Sahni Institute of Paleobotany. Shri Raj Kamal Srivastava, General Secretary of UP Scientific and Rationalist Society, was the local coordinator. During its five-day halt in Lucknow the train attracted 1.5 lakh visitors, including students of 120 schools. Local volunteers guided the visitors and helped in the orderly viewing of the exhibition despite the heavy rush of visitors.

The comments from the visitors showed the extent to which the exhibits had impressed them, particularly the younger generation. The exhibits of the DRDO and ISRO seemed to have made a lot of impact on the visitors. A 10-year old girl student was amazed by the miniatures of fighter planes and tanks and commented that the exposition had strengthened her will to be a fighter pilot. A 12-year-old student described the Exhibition as an eye opener while another said that it had generated a lot of confidence in him. Quite a few students pursuing courses in science subjects termed it as a real learning experience not only for them but also for the teachers accompanying them. A special feature of the train's



programme in Lucknow was the Open Learning Session organized for three days from January 11 in which Dr C. M. Nautiyal responded to questions from the students on the various exhibits. The HAL Ham Club had established a VHF ham radio communication desk, which demonstrated to the public the value of ham.

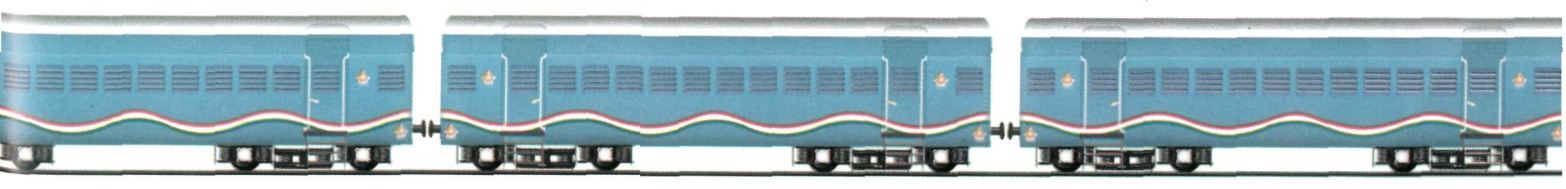
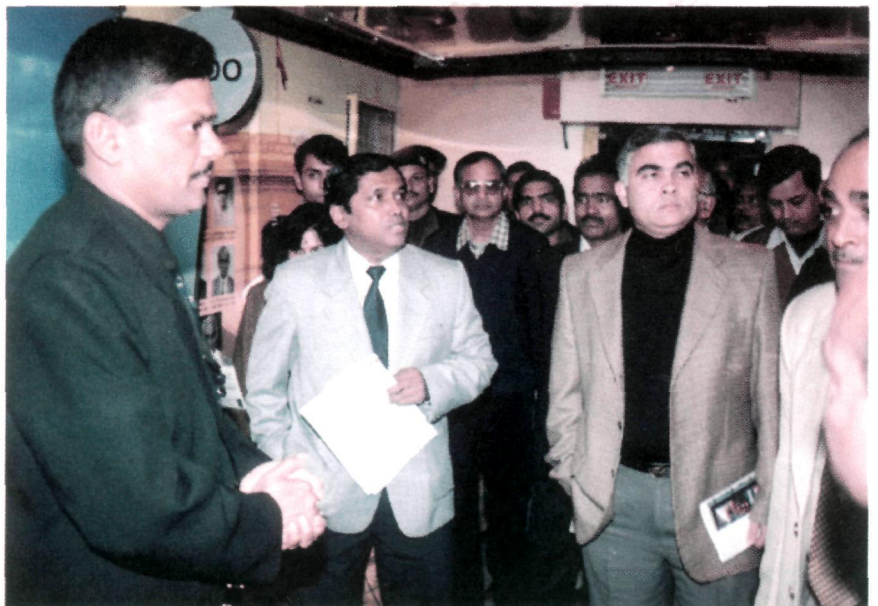
After satiating the knowledge thirst of Lucknowites, the Vigyan Rail reached the industrial town of Kanpur on January 14. It happened to be the day of Makar Sankranti and the devout were having a dip in the holy Ganga even as the train seeking to dispel blind faith chugged into platform No. 3, which was buzzing with activity since morning as a large number of visitors had already turned up. Shri Prashant Trivedi, District Magistrate and Dr. S.G.Dhande, Director of Indian Institute of Technology, Kanpur, opened the Exhibition for public viewing. Some of the city schools had declared it a holiday to enable the students visit the Exhibition as they considered it a golden opportunity for the students, especially those appearing for the Board examination, to widen their knowledge base. The students in turn took their visit to the Vigyan Rail seriously as a part of their class work rather than as a picnic. They took profuse notes from the exhibits and sought from the guides the minutest details. A team of 18 railway scouts managed the crowd, which crossed the figure of one lakh in a span of four days.

The confluence, *Sangam*, of three holy rivers – Ganga, Yamuna and Saraswati – has all along been attracting the devout from all parts of the country to Allahabad; for a week from January 18, 2004, the city had an added attraction of a different nature.



One of the guests keenly watching the surgical instruments used in the ancient days displayed by the National Council of Science Museums when the Vigyan Rail was at Kanpur.

Delegates viewing exhibits inside Vigyan Rail at Kanpur.





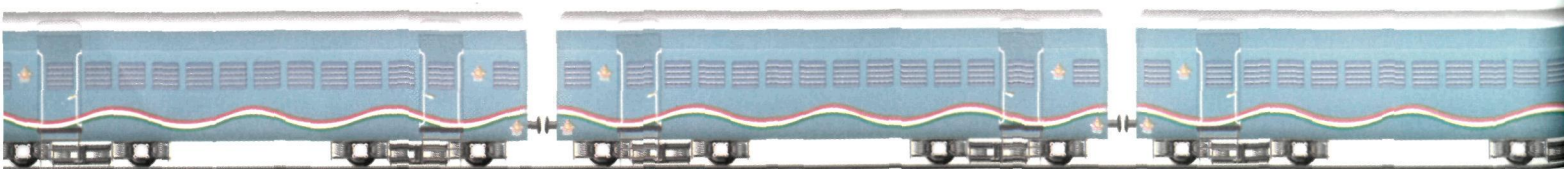
Visitors lined up to view Vigyan Rail at Allahabad.

Foreign guests viewing with interest some of the exhibits at Allahabad.



During this period the Vigyan Rail, which sought to inculcate a scientific temper among the general public, was stationed in the Troop Siding platform. The district administration and railway authorities decided to station the Vigyan Rail on the Troop Siding platform as a lot of pilgrim traffic was expected at the main platform due to the Kumbh Mela. The residents of Allahabad and nearby areas woke up on January 18 to the news of the scheduled arrival of the Science Exposition headlined in all the local newspapers and made a beeline to the Troop Siding near DSA Ground. The Exhibition was opened for public viewing in the afternoon in the presence of a large number of special invitees. Shri R. N. Tripathi, District Magistrate, was the Chief Guest on the occasion. The other distinguished guests included Prof. K. B. Pandey, Chairman of UP Public Service Commission, Dr. R.S.Kulkarni, Director of Harish Chandra Research Institute, Shri A.K.Singh, Additional Divisional Railway Manager and Dr. A.K.Gupta, Dean, Faculty of Science, Allahabad University. They all commended the initiative taken by Vigyan Prasar in organizing such an exhibition and taking it to the doorstep of the common man. Dr V. B. Kamble, Director, Vigyan Prasar, in his welcome speech, explained the underlying idea of the Vigyan Rail.

Judging from the long queues every day, the train seemed to be a hit among the people, especially the younger generation. Over a lakh of visitors, not only from the city but also from the villages around, had a glimpse of the various exhibits. The visitors were all praise for Vigyan Prasar and the Department of Science and Technology for their efforts to popularize science. The impact



was such that the Headmaster of one of the schools said that one question paper on the exhibits in Vigyan Rail would be set for the students of his school. This indicated that Vigyan Rail was being looked upon as a part of education.

From Allahabad the train moved to the holy town of Varanasi, where it was received and opened for public viewing at the Cantonment Station by Prof P. Ramachandra Rao, Vice Chancellor of Banares Hindu University, Shri Dev Sharan Singh Yadav, Divisional Commissioner and Shri R. K. Bansal, Divisional Railway Manager. Shri Amod Kumar Gupta, Divisional Commercial Manager, Railways, proposed a vote of thanks. The train attracted 1,25,000 visitors during its five-day halt in Varanasi. Students came from nearby towns in school buses and stood in the queue for two to three hours to see the exhibits. In view of the heavy rush of visitors the timing for public viewing was extended on some of the days.

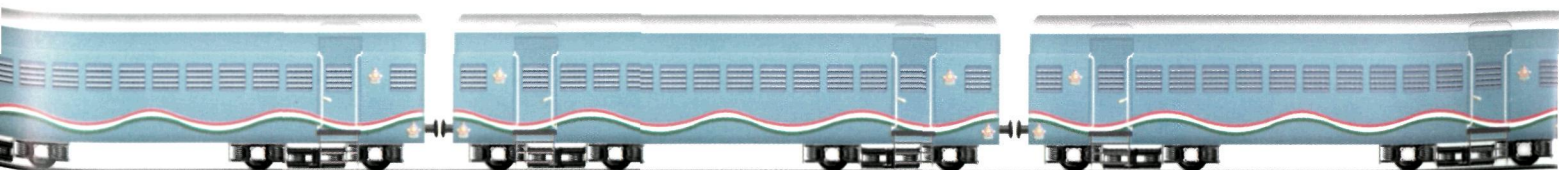
From Uttar Pradesh the Vigyan Rail proceeded on its onward journey to cover the remote areas in North Bihar. The initial programme was to cover only Muzaffarpur, Samastipur and Barauni; but later Sonapur was included in the itinerary. When the train reached Sonapur on January 29, Shri Neeraj Kumar, Divisional Railway Manager, received it and opened it for public. The halt was for only one day and 8,000 visitors had a glimpse of the exhibits on that day.

The following day, the Martyrs Day, the train reached Muzaffarpur where the District Magistrate Shri Amrit Lal Meena, opened the Exhibition. The rush of students was such that they were allowed into the



Dignitaries lighting lamp during inaugural function at Varanasi.

One of the distinguished guests writing about his impressions in the Visitors Book at Muzaffarpur.



Long queue of students waiting to enter Vigyan Rail at Samastipur.



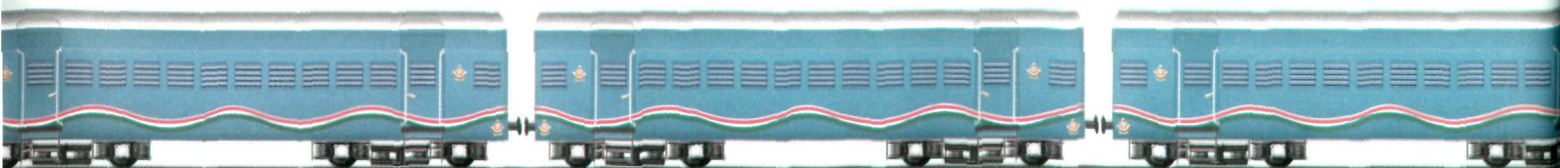
train even before the formal opening ceremony. Besides the students, Dr Nihar Ranjan Singh, Vice Chancellor of Dr B.R.Ambedkar University visited the Exhibition and was highly appreciative of the efforts put in by Vigyan Prasar to promote science awareness among the public. Students accounted for 50 per cent of the total visitors whose number rose day by day to reach a total of 54,000 over three days. .

For the next three days from February 2 the train was at Samastipur where the Divisional Railway Manager, Shri R. C. Aggarwal, opened the Exhibition for the public and among the visitors was the District Magistrate Shri Lal. Visitors came in local trains from nearby areas to see the exhibits. The total number of visitors was 55,000 and this brought out the latent thirst for knowledge among the public in such remote areas.

From Samastipur the train reached the oil town of Barauni, where Shri T. Sudheer, Assistant General Manager of Barauni Refinery, opened the Exhibition for the public in the presence of large number of invitees including the Regional Manager of East Central Railway, Shri Asgar Ali. Besides the entire township of the Refinery, students and common people from the whole Begusarai district also turned up to see the Exhibition. In three days the Exhibition attracted some 50,000 visitors.

The Science Expo on Wheels then covered North Bengal where it was scheduled to halt at Siliguri and Alipurduar. The train reached Siliguri on the evening of February 7, almost 20 hours behind schedule. As a result the visitors could view the exhibits only for a couple of hours on the first day

Dignitaries visiting the exhibits at Barauni.



after Prof P.K.Saha, Vice Chancellor of North Bengal University formally opened the Exhibition by lighting the traditional lamp. However, on the remaining two days the number of visitors increased to 50,000 a day. There were long queues every day and the visitors, including students, came from the nearby hill districts of Darjeeling, Kalimpong and Kurseong. One could see excitement writ large on the faces of students on seeing the models of satellites and defence equipment.

The train then moved on to Alipurduar where Shrimati Pampa Babbar, Divisional Railway Manager opened it for the public in the presence of the officials of the State Government and the Railways. Shrimati Babbar saw the exhibits and evinced particular interest in Ham Radio communication, which was highlighted in one of the panels put up by the Vigyan Prasara in the last coach. The visitors included a large number of students from nearby hill areas and towns like Cooch Behar, Jalpaiguri and villages bordering Bangladesh. More than a lakh of visitors saw the exhibits over the four days the train halted at Alipurduar.

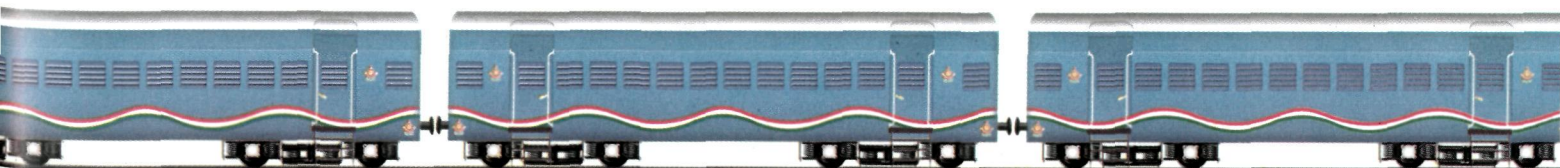
After covering the remote areas of North Bengal, the train reached Guwahati, capital of Assam, on February 15. The Director of Vigyan Prasara, Dr V. B. Kamble, had reached Guwahati a day earlier to brief the media about the objectives of this unique Science Exhibition on Wheels. As a result of the extensive media coverage on the morning of February 15, which happened to be a Sunday, a large number of curious visitors had assembled at the station long before the train arrived and was opened for the public. The distinguished guests who participated in the inaugural function included Prof G



Prof. P. K. Saha, Vice Chancellor, North Bengal University, inaugurating Vigyan Rail at Siliguri. ADRM, New Jalpaiguri and Shri Gopal Lama, SDM, Darjeeling district are also seen in the photograph.



Students having a look at Vigyan Rail at Alipurduar





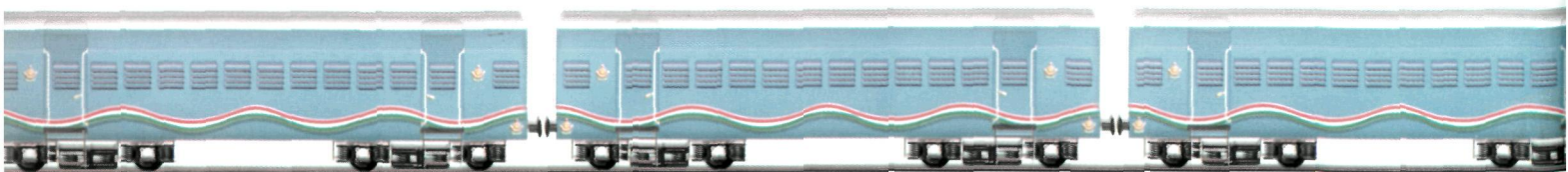
Inaugural function of Vigyan Rail at Guwahati.
Smt Leena Sarma, PRO, NF Railways lighting the lamp.

Inaugural function of the Vigyan Rail at Dimapur.
From left to right: Shri Sandeep Baruah, S.S.O. (Vigyan Prasar, New Delhi), Dr. Zavei Heise, S.S.O. (DST, Nagaland), Shri Rajiv Bansal, Secretary (DST, Nagaland), Shri Deo Nukhu, S&T minister (Nagaland), Dr. Inakhe Sumi, Hony. Director, NIHESW and Shri M.C. Chauhan (ADRM, Lumding)



Talukdar, Vice Chancellor of Guwahati University, Dr. D Barkataki, Shri M.C.Chauhan, ADRM and Shri Afsar Hazarika, Divisional Commissioner, Kamrup. After the inauguration the inquisitive visitors clambered into the train to have a glimpse of the country's scientific heritage and achievements after Independence. The students found the exhibits quite educative and some of them could not hold their excitement on seeing the models of spacecraft. For once science occupied the center-stage in the minds of the people of Assam and nearby areas at least for a whole week when the Vigyan Rail was stationed in Guwahati.

Dimapur in Nagaland was the next halt. Here the Nagaland Minister for Higher Education, Science & Technology and IT, Shri Deo Nukhu, opened the Exhibition for the public soon after its arrival on February 21. The Department of Science & Technology, Nagaland jointly with Nagaland Institute of Health, Environment & Social Welfare (NIHESW) hosted the inaugural function, which was presided over by Shri Rajiv Bansal, Secretary to Government of Nagaland in the Department of Science & Technology. Dr Inakhe Sumi, Honorary Director of NIHESW welcomed the guests who included 200 school children besides Shri Jyoti Kalash, DC, Dimapur, and Shri Janardan Kumar, SP, Dimapur. Dr. Zavei Hiese of the Department of Science & Technology, Nagaland proposed a vote of thanks. This function also marked the official launch of the Year of Scientific Awareness by Nagaland Government. Students from far-flung areas like Kohima in Nagaland and Numaligarh in Assam came to see the exhibits. During its three-day halt



in Dimapur the Vigyan Rail attracted some 30,000 visitors. Shri Andrew Ahoto, State Coordinator of National Children's Science Congress, Nagaland had arranged for volunteers from Livingstone Public School. As the Nagaland Minister observed at the opening function, the Exhibition was an eye-opener for the young and old alike among the visitors.

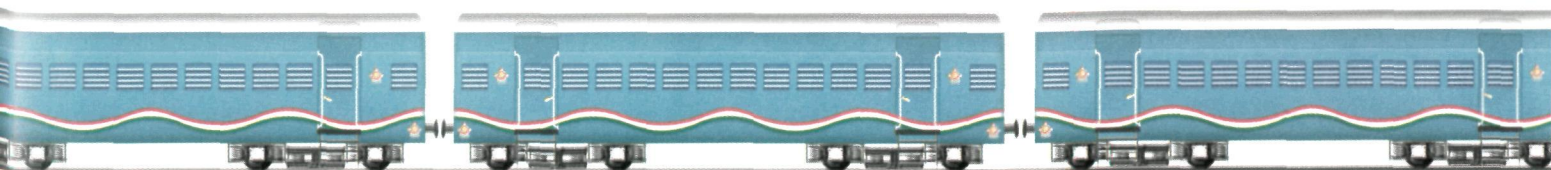
The next halt was originally scheduled at Dibrugarh but for operational reasons the halt was changed to Tinsukia where Shri Ashok Kumar, Additional Divisional Railway Manager, opened it for the public on February 24 in the presence of a large gathering of visitors and invitees. The Exhibition evoked overwhelming response not only from the local residents but also from those who came from far-flung areas of Arunachal Pradesh. The total number of visitors during the four days the train was stationed in Tinsukia reached 50,000. The rush of visitors was so much that every day the Exhibition timing had to be extended by two hours.

After covering the North Eastern Region the Science Exhibition came to Patna, the seat of Bihar Government and an important centre of learning in ancient India. Visitors turned up in large numbers on the morning of February 28, the day it was originally scheduled to be opened for the public. But they had to return home disappointed as the train arrived only in the evening and was opened for the public only on the following morning by Shri Chandrika Rai, Minister for Science & Technology, Bihar. The special invitees at the inaugural function included Shri Burman, Divisional Rail Manager, Dr Shekhawat, Director of Sri Krishna Vigyan Kendra and Dr. A Ghosh,



Shri Ashok Kumar, ADRM, inaugurated the exhibition at Tinsukia.

Hon'ble Minister of Science and Technology, Govt of Bihar, Shri Chandrika Rai inaugurating Vigyan Rail at Patna.





Visitors in different age groups viewing the exhibits in one of the coaches at Durgapur.

Director of the Planetarium. The Rajendranagar Terminal where the Vigyan Rail was stationed buzzed with activity with hundreds of curious visitors waiting in serpentine queues to enter the train and see the exciting exhibits. The youngsters among the milling crowd found the exhibits quite thrilling. A team of NCC cadets and 15 volunteers locally recruited helped in managing the rush of visitors and guiding them through the Exhibition. The average daily turn out of visitors was around 40,000. Thus during its stoppage at Patna for five days the train attracted a record 2 lakh visitors.

The steel town of Durgapur in West Bengal was the next halt and Shri Raj Kumar, Divisional Railway Manager, Asansol opened it for the public in the presence of Sub Divisional Magistrate of Durgapur and other senior officials. Around 10,000 visitors from Durgapur and neighbouring areas saw the exhibits during the two days the train halted there.

From the steel town it moved on to Ranchi, the capital of Chattisgarh, where the local Divisional Railway Manager, Shri S.K.Behra, opened the Exhibition, which attracted some 60,000 visitors over three days. The visitors were in different age groups but the young outnumbered the old. They all had come from far-off places and waited long hours to get into the train and see the exhibits. The students especially evinced keen interest in the exhibits and helped each other in understanding them.



Shri S. K. Behra, DRM, Ranchi, inaugurating Vigyan Rail at Ranchi.

"A unique learning experience". This was how the Divisional Railway Manager of Howrah, Shri H.V.Sharma, described succinctly the Vigyan Rail as he opened the Science Exhibition for public view on March 11 at Howrah, where it had arrived the



previous evening from Ranchi. Curious visitors thronged the station on the very first day of its week-long halt at Howrah. Despite the impending annual examinations, a large number of students turned up to see the Science Exhibition and benefit from the exhibits. The Exhibition attracted visitors not only from Kolkata but also from nearby towns and the total number of visitors reached the figure of one lakh.

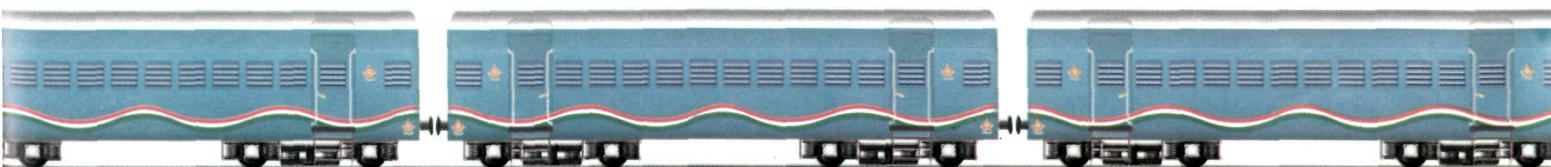
The next halt was Bhubaneswar, the capital of Orissa where the special train was stationed for three days from March 18. Shri Sujit Ranjan Chaudhuri, General Manager of East Coast Railway, inaugurated the Exhibition, which aroused considerable interest among the students. The overwhelming response was manifested in the increasing number of visitors, which swelled from 15,000 on the first day to more than 50,000 on the last day. The National Council of Science Museums organized a drawing competition on the second day in which a large number of school children participated.

Cuttack, the largest city in Orissa, which had earlier been the seat of Orissa Government, was provided an opportunity to play host to the Science Exhibition on Wheels for two days from March 21, though it was not in the original itinerary. Long before it arrived in Cuttack from Bhubaneswar there was a long queue of visitors eagerly waiting to see the exhibits. A number of visitors, who had missed it at Bhubaneswar, came to Cuttack. Schools in and around Cuttack organized special trips for students to visit Vigyan Rail and benefit from the exhibits. As many as 20,000 visitors saw the Exhibition.



Delegates viewing exhibits inside Vigyan Rail at Howrah.

Shri Sujit Ranjan Chaudhuri, General Manager, East Coast Railways, inaugurating Vigyan Rail at Bhubaneshwar.





Students waiting in queue at Visakhapatnam.

Shri S. P. Chaudhary, AGM, Central Railway and Shri N. C. Sinha, DRM, Central Railway viewing exhibits inside Vigyan Rail at Nagpur.



The special train then travelled to the port town of Visakhapatnam in Andhra Pradesh where Vice Admiral Shri O.P.Bansal, Flag Officer Commanding in Chief of the Eastern Naval Command, opened it for public viewing in the presence of a large gathering of special invitees including Shri S.V.Arya, Divisional Railway Manager. Railway scouts and local volunteers assisted in managing the heavy rush of visitors totalling 45,000 and guiding them through the Exhibition. As many 35 schools in and around the town brought their students to see the exhibits.

After travelling for three months since it was flagged off from Safdarjung Railway Station in New Delhi the Science Exhibition on Wheels reached Durg on the morning of March 27. Later that evening Prof. B.P. Chandra, Vice Chancellor of Pt. Ravi Shankar University, Raipur, opened it for public viewing in the presence of special invitees who included Shri Umesh Singh, Additional Divisional Railway Manager and Dr. P.K.Bhatt, Director of Chattisgarh State Council of Science & Technology. On the first day the Exhibition was open for only a couple of hours as it was opened for the public in the evening. During the next three days it was open the whole day and it attracted more than 60,000 visitors, including students from 50 schools in and around Durg. Besides the railway scouts, local volunteers helped in guiding the visitors. The Additional Chief Secretary to Chattisgarh Government, Dr Indira Mishra, visited the Exhibition on the last day and distributed certificates to the volunteers. She indicated in her brief remarks on the occasion that there was a proposal to build a science city in Chattisgarh.



From Durg the train travelled to Nagpur where Shri S. P. Choudhary, Additional General Manager of Central Railway, opened it to the public on the afternoon of March 31. The inaugural function was attended by a large gathering of visitors and invitees including Shri N. C. Sinha, Divisional Railway Manager and Shri P. A. Launghare, Additional DRM. Local newspapers had prominently covered the scheduled arrival of the train and kindled the interest of residents to such an extent that over the next four days 45,000 visitors from Nagpur and surrounding areas saw the exhibits. Every evening the Nagpur Station of All India Radio had a programme for half an hour giving details of the exhibits and the impressions of the visitors.



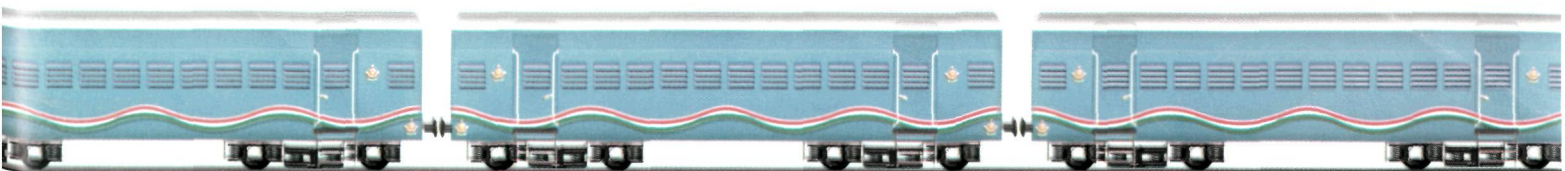
Visitors viewing the exhibits at Nagpur.

The next halt for the Vigyan Rail was Secunderabad in Andhra Pradesh where it halted for a week from April 5. Though the Board examinations were over some of the schools still had their examinations; but still the students came in large numbers to see the exhibits. One of the students from Nagarjuna Grammar School remarked that it was rare opportunity to see so many science exhibits under one roof and so she did not want to miss it. The City Police Commissioner, Shri R. P. Singh, and the Divisional Railway Manager, Shri P.B.Murthy, inaugurated the Exhibition, which attracted around 30,000 visitors.

Delegates visiting Vigyan Rail at Secunderabad.



The temple town of Tirupathi was the next to play host to Vigyan Rail for four days from April 12. The delayed arrival from Secunderabad upset the scheduled programme for inauguration. Shri A. Giridhar, Collector of Chittoor, came in the morning to the station to open the Exhibition for the public, but due to other official





Function to mark the opening of the exhibition at Chennai Central station. Dr E. Balaguruswami, Vice Chancellor of Anna University (in blue shirt, sitting) opened the Exhibition.

Visitors inside Vigyan Rail at Chennai.



work he could not stay on till the evening when the train actually arrived. Shri V Carmelus, Divisional Railway Manager of Guntakal, presided over the inaugural function and Shri Ajeya Kallam, Executive Officer of Tirumala Tirupati Devasthanam, opened the Exhibition for the public by cutting the ribbon. The Regional Science Centre coordinated the arrangements and had put up banners and posters throughout the town and its neighbourhood. The Regional Science Centre also conducted quiz programmes on all the four days on the exhibits and the winners were presented with books brought out by Vigyan Prasar.

Even as the summer heat was rising the Science Train moved further down south and reached Chennai on April 16 to a warm welcome from curious visitors who had thronged the 11th platform in Chennai Central Station undeterred by the sultry weather. The Anna University had joined hands with Vigyan Prasar and the Railways to make the Chennai visit of Vigyan Rail a memorable event. A grand inaugural function presided over by Shri V. Anand, General Manager of Southern Railway, was organized at which Shri E Balaguruswamy, Vice Chancellor of Anna University, cut the ribbon to declare the Exhibition open to the public. Dr. R. Sridher, Director of Audio Visual Research Centre of Anna University, proposed a vote of thanks. All the speakers highlighted the scientific heritage and achievements of the country and appealed to the student community in particular to visit the Exhibition. The participating agencies had their representatives on the spot to interact with the visitors and explain the exhibits. A record number of one lakh visitors, mostly students, availed of this rare



opportunity to broaden their general knowledge and appreciate the contribution of science and technology to society.

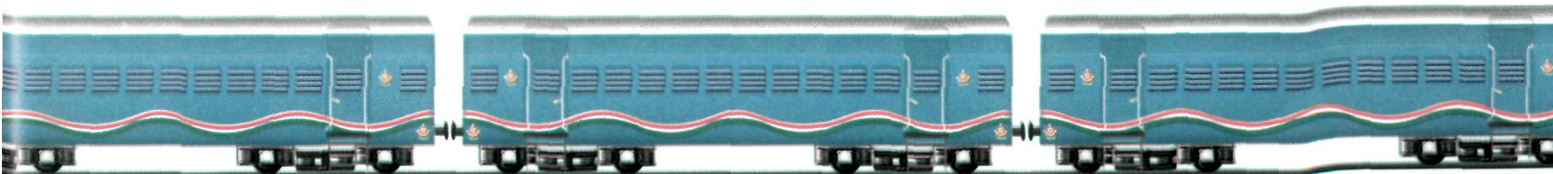
A special feature in Chennai was the valedictory function in which the impact made by the Exhibition on the public at large was highlighted. Shri N. Jayaram, Divisional Railway Manager, who delivered the valedictory address, expressed his happiness that the very purpose of Vigyan Rail project had been achieved to a large extent. The experts from different participating agencies had a tough time answering a steady stream of questions from the students who wanted to know more than mere statistical data about the country's achievements in science and technology. Students took down notes and drew pictures in their notebooks of the exhibits.

The next halt was Kanyakumari, the southernmost point of mainland India. According to the original schedule the train was to be stationed in Kanyakumari for two days – April 24 and 25 – but due to technical reasons the railway authorities suggested that the train should be taken to the nearby Nagercoil station on April 25. In Kanyakumari Prof. M Suresh Chandrakumar of Scot Christian College joined hands with Vigyan Prasar and railway officers in making necessary arrangements. Dr N. Vedachalam, Director, Liquid Propulsion Systems Centre, Thiruvananthapuram, inaugurated the Exhibition in Kanyakumari in the presence of a large gathering of visitors and special invitees, including the Deputy Commercial Manager of Southern Railways. Dr Vedachalam informed the audience about the ISRO programme for deploying satellites for different purposes. Around 5,000



Young visitors watching the display by the Ministry of Non-conventional Energy Sources at Kanyakumari.

Dignitaries visiting Vigyan Rail at Thiruvananthapuram.





Students waiting to enter Vigyan Rail at Hubli.

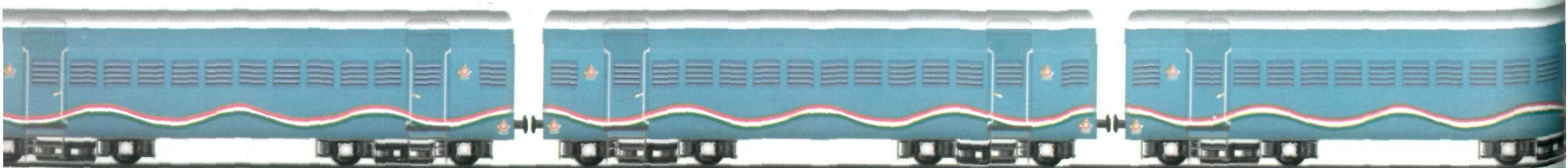
walks of life and age groups went round the Exhibition to broaden their knowledge and vision of science and technology.

The historic town of Hubli played host to the Science Exhibition on Wheels on its arrival from Bangalore on the afternoon of May 18. An enthusiastic crowd of students was waiting from the morning as the train was scheduled to arrive in the morning itself. It turned out to be a long wait as the train arrived only in the afternoon and they could get into the train to see the exhibits only after Shri V. N. Biradar, Director of Karnataka Institute of Medical Sciences, declared it open for the public. The inaugural function was attended by a number of special invitees including Shri P. Rajagopalan, Divisional Railway Manager, Shri V. A. Kulkarni, Director of Science and Technology Centre, Dharwar, Ms. Sarayu Desai, who was the local coordinator on behalf of Vigyan Prasar and Shri A. V. R. K. Sainath PRO, Hubli. The Exhibition evoked such an interest that around 70,000 visitors turned up during the three days it was in Hubli.

Shri Digambar Kamath (center), Minister of urban affairs, Goa and Dr. N. P. S. Varde, Member secretary, Goa State Council for S&T having a look at the exhibits at Madgaon.



The next destination for the train was Madgaon in Goa. Here too the schedule was upset by the late arrival of the train. Consequently the duration of the Exhibition in Madgaon got reduced to three days, starting May 22, when Shri Digambar Kamath, Goa minister for Urban Affairs opened it for public viewing. The invitees at the inaugural function included Dr. N. P. S. Varde, Member Secretary of Goa State Council for Science and Technology. The Exhibition attracted over 40,000 visitors before it moved to its next halt, Ratnagiri on May 25, where Dr. Subhash Dev, Principal, Gogate Jogalekar College, opened it to



the public in the presence of Shri D. R. Sundaram, Regional Railway Manager, Konkan Railways and Prof R. B. Kale of G.J.College. It was a hit in Ratnagiri with 30,000 visitors of all age groups and from all walks of life making a beeline for the exhibits.

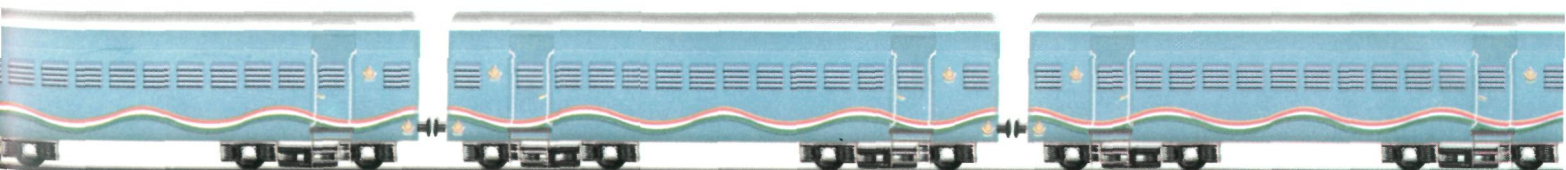
From Ratnagiri the Vigyan Rail chugged into Mumbai Central on May 28. Shri M.Z Ansari, General Manager of Western Railway, opened it to the public in the presence of Shri G. S. Rautela, Director of Nehru Science Centre and Shri M. V. Kamath, President of Vigyan Prasara. A large number of curious visitors, mostly students, had been waiting on Platform No. 5 since early morning and they thronged the coaches to have a glimpse of the hoary past and the modern achievements of the country in the field of science and technology. The Exhibition evoked such an interest that during the four days of its halt in Mumbai Central Station that more than 70,000 visitors turned up. Shri P. K. Basu of Nehru Science Centre, who was one of the coordinators, described it as a unique initiative in popularization of science. Live science shows and painting competition for visitors below 15 years of age were organized by Nehru Science Centre. On June 1 the train moved into Chhatrapati Shivaji Terminal, previously known as Victoria Terminus, where Shri S. B. Ghosh Dastidar, General Manager of Central Railway, opened it for public viewing. Here too the Exhibition attracted almost 10,000 visitors daily. Thus in Mumbai more than one lakh visitors saw the Exhibition.

After covering the financial capital of the country, the train reached Pune on June 5. Shri Rajesh Angale, Additional Divisional



People viewing exhibits inside Vigyan Rail at Ratnagiri.

Students viewing various exhibits inside Vigyan Rail at Mumbai.





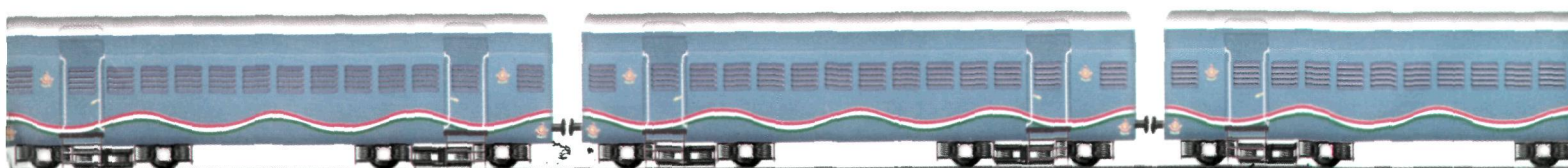
Dignitaries viewing Vigyan Rail exhibits at Pune.

Railway Manager, opened the Exhibition to the public in the presence of Shri Suhas Lohekare, PRO of Railways and scientists from National Chemical Laboratory, Defence Research and Development Organisation, and BSNL. The public response to the Exhibition was overwhelming indeed, as evidenced by the long queues every day despite the scorching heat. The number of visitors during the five days of the Exhibition in Pune was around 80,000. The eminent scientist, Dr. Vasant Gowariker, visited the Exhibition and commended the efforts put in by Vigyan Prasar and the Indian Railways to take science to the masses. He was equally appreciative of the response of the people. He noted that working people, students and old women with grandchildren in tow visited the Exhibition and their curiosity could not be satisfied entirely. Models captivated the visitors more than charts and written material. To most of the visitors it was the first exhibition of its kind to be seen. Some of the visitors came from nearby towns like Baramati by local train to see the exhibits. An event of great scientific significance – Venus Transit – took place on June 8 when Vigyan Rail was in Pune.

Visitors viewing Vigyan Rail exhibits at Vadodara.



From Pune the Science Exhibition on Wheels arrived in Vadodara in Gujarat in the evening of June 10. All roads in Vadodara led to the railway station where Shri G. Sharma, Additional Divisional Railway Manager, and Shri R. D. Meena, Senior Divisional Commercial Manager of Railways, declared the Exhibition open to the public. The Exhibition was quite a hit on the very first day and youngsters accompanied by their parents and teachers swarmed the station to have a glimpse of the exhibits. During the five days it was in Vadodara the



Exhibition attracted around 50,000 visitors. A team of railway scouts and locally recruited volunteers guided the visitors and explained the exhibits to them.

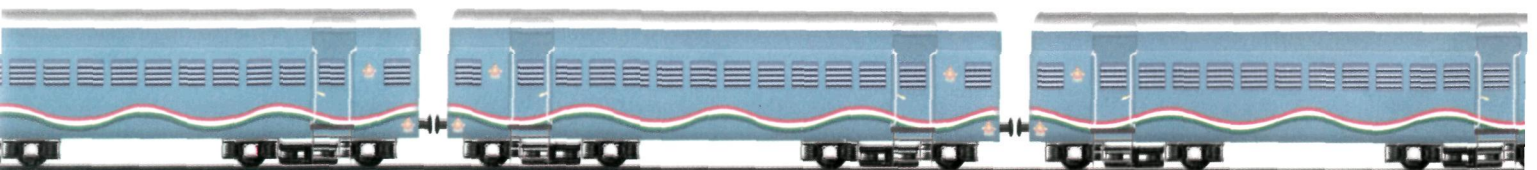
On June 15 the Science Train arrived in Ahmedabad. Shri L. M. Sahori, Divisional Railway Manager opened the Exhibition to the public by lighting the traditional lamp in the presence of a large number of visitors and special invitees, including Shri Sanjay Agrawal, CEO of Gujarat Council of Science City, which coordinated the programme in Ahmedabad. The Exhibition attracted the youngsters the most, as could be seen from their large presence among the visitors and the interest they evinced in understanding the exhibits. Around 50,000 visitors turned up every day during the train's halt in Ahmedabad.

The next halt was Rajkot where Dr. Vallabh Bhai Kathiria, MP, Lok Sabha, declared the Exhibition open to the public in the presence of Shri Rajiv Kumar, Additional Divisional Railway Manager, Shri Sanjay Kumar Shukla, Assistant Commercial Manager, and Dr. V. B. Kamble, Director of Vigyan Prasara. The wide media coverage in advance of its arrival evoked the interest of residents from Rajkot and nearby areas to throng the Bhaktinagar railway station on all the five days of its halt there. The rush was such that the Exhibition was kept open till late night. In all over four lakh visitors of all age groups turned up. Students from 300 schools viewed the exhibits, which were explained by 18 volunteers who were locally recruited. A team of 50 railway scouts regulated the crowd. Busloads of students turned up from as far as Jamnagar. The students would start queuing up at 7 in the morning to have a glimpse of the Exhibi-



Shri L. M. Sahori, Divisional Railway Manager cutting the tape to open the exhibition at Ahmedabad.

Visitors flock Vigyan Rail at Rajkot.





Visitors – young and old, men and women – lining up on the platform at Bhopal to get into Vigyan Rail.

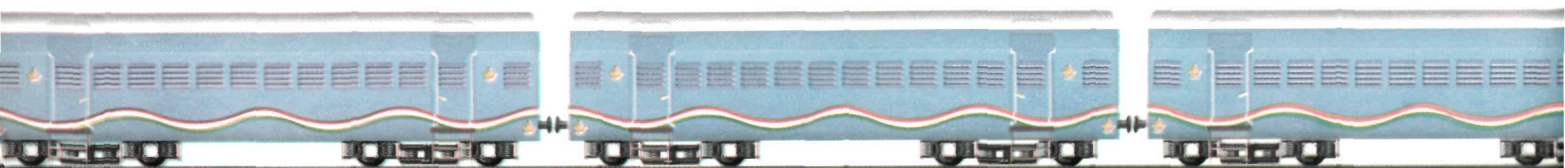
Students lining up on the platform to get into the Vigyan Rail at Agra.



tion. Many waited for hours in the scorching Sun before they could enter.

From Gujarat the Science Exhibition moved to Madhya Pradesh in its cross-country journey. It reached Bhopal on June 27, one day behind schedule, and was opened to the public on the morning of June 28 by Shri Devi Prasad Pande, Divisional Railway Manager. The District Collector Shri Anil Shukla had agreed to inaugurate the Exhibition but could not do so because of the delayed arrival of the train. He however issued an appeal through the media to all the schools to send their students to the Exhibition and, as a result, students, not only from Bhopal but also from Indore and Bina, turned up in large numbers at the Bhopal station to see the exhibits. There were around 80,000 visitors of all age groups. The Regional Science Centre organized a quiz on India's Science and Technology Heritage and a few other programmes during the Exhibition hours.

The famous Taj Mahal had a competitor as a centre of attraction for four days from July 4 when the Science Exhibition on Wheels showcasing India's heritage and modern day achievements in science and technology was berthed in Agra. Dr. G. C. Saxena, Vice Chancellor of Dr B.R.Ambedkar University, declared the Science Exhibition open to the public in the presence of a large gathering of visitors and special invitees including Shri M. Suresh, Divisional Railway Manager, Shri Nitishwar Kumar, District Magistrate and Dr. Roshan Lal, Chief Medical Officer. Around 75,000 visitors turned up to see the exhibits. They included not only residents of Agra but also from nearby villages. Dr. Ashwini Kumar of Regional Science Centre



and Dr Ashok Kumar of Dr B.R.A. University helped in coordinating the arrangements at Agra.

The pink city of Jaipur in Rajasthan, known for its historic palaces and monuments, was the next halt of Vigyan Rail. Shri Rakesh Mohan Agarwal, General Manager of North Western Railways, opened the mobile Science Exhibition for the public in the presence of a large gathering of visitors and special invitees including senior railway officials and Ms Roli Singh, Director, Department of Science and Technology, Rajasthan Government. Despite the scorching heat of summer a turnout of one lakh visitors was recorded over the five days the Exhibition was in the Gandhinagar Railway Station in Jaipur during July 8-12. The second platform was overflowing with students curious to have a glimpse of the exhibits and those who went into the train were busy taking down notes and making searching inquiries about the exhibits from the volunteers. Shri A. K. Bhargava and Shri Arvind Sharma of the Department of Science and Technology, Rajasthan Government helped in coordinating the arrangements in Jaipur.

From Jaipur the Vigyan Rail moved to Kota where the District Magistrate Shri Tanmay Kumar inaugurated the Exhibition in the presence of Shri S.K.Sharma Divisional Railway Manager, and other senior officials besides a large number of visitors. The Exhibition was in Kota for two days and during this period it attracted more than 50,000 visitors, mostly students who evinced keen interest in the exhibits.

On its next leg, the Vigyan Rail covered three other towns of Rajasthan – Ajmer, Jodhpur and Bikaner. Locally recruited and



Student visitors looking at one of exhibits at Jaipur.

Girl students viewing the exhibits in one of coaches at Kota.





The Chief Guest, Shri Ashwini Bhagat, Collector (center), walking through the Vigyan Rail at Ajmer.

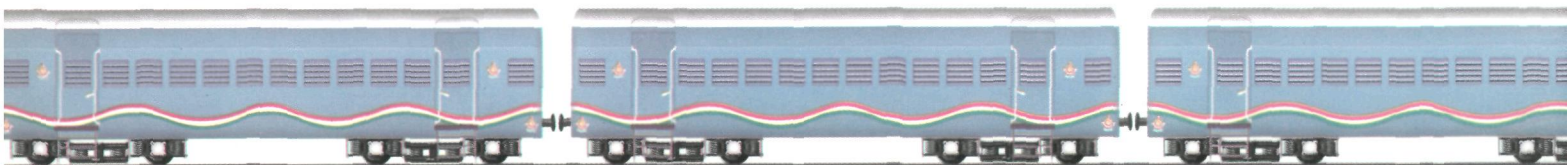
The Chief Guest Shri Santok Singh, DRM, walking through the exhibition in Jodhpur.



trained volunteers explained the exhibits to visitors in local language and a team of scouts and RPF personnel regulated the crowd in all these three towns. Ajmer is an important pilgrim centre and the special Science Train was an added attraction for three days from July 15. Shri Ashwini Bhagat, Collector of Ajmer inaugurated the Exhibition in the presence of special invitees including Shri Brijesh Gupta, Additional DRM and Shri Madan Goel, District Education Officer. Around 500 students were present when the exhibition was declared open. Almost all the schools in the town organized trips for their students to the Vigyan Rail. Over 40,000 visitors of all groups turned up to view the exhibits.

From Ajmer the train moved to Jodhpur where Shri Santokh Singh, Divisional Railway Manager, inaugurated the Exhibition by cutting the ribbon on July 18 in the presence of a large gathering of school children. As in Ajmer, all the schools in Jodhpur and nearby places organized visits of their students to the Exhibition. The District Educational Officer declared July 22 as holiday for schools to enable the students to come to see the exhibits. As a result, the number of visitors swelled to 70,000 during the five days the Exhibition was in Jodhpur. The Commissioner of Jodhpur, Shri Atul Sharma, visited the Exhibition on July 20 and saw the exhibits with keen interest.

Bikaner was the next scheduled halt but due to technical reasons the Vigyan Rail was stationed at Lalgarh, five kilometres from Bikaner Station. The District Collector, Shri Alok, opened the Exhibition for the public by cutting the ribbon in the presence of special invitees including Shri V. K. Jain, Divisional Railway Manager and Shri



Ratan Lal, Additional DRM. Around 700 school children welcomed the invitees with a traditional dance at the inaugural function. Here too the schools organized trips for their students to the Lalgarh Railway Station to view the exhibits. A total of around 70,000 visitors of all age groups visited the exhibition. A non-governmental organisation, Bright Youth Sansthan, organized a dance drama on adolescent awareness on the platform. The entire platform wore a festive look.

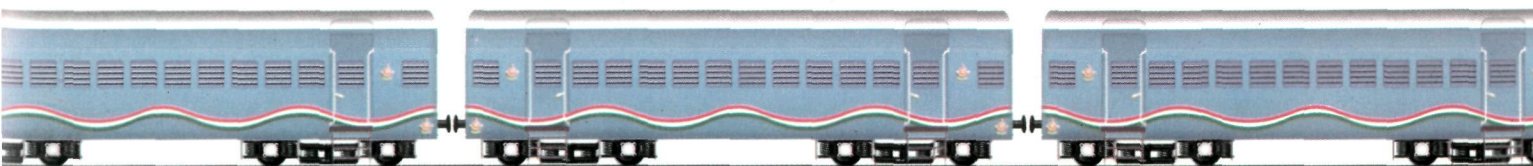
From Rajasthan the train moved to Punjab where its first halt was Ferozepur. Shri Dharam Singh, Divisional Railway Manager inaugurated the Exhibition on July 27 in the presence of senior railway and state government officers besides a large gathering of visitors. The Deputy Commissioner of Ferozepur, Shri Ranjit Singh, visited the Exhibition on July 29. The schools in and around Ferozepur arranged for their students to visit the exhibition. The Exhibition attracted some 30,000 visitors comprising not only students but also common people. Media reports described the Exhibition as a bridge between common man and science for society.

Amritsar, famous for its Golden Temple, had an added attraction for five days during July 31-August 4 when the Science Exhibition on Wheels arrived there from Ferozepur. Dr. S. P. Singh, Vice Chancellor, Guru Nanakdev University and Shri M. S. Chalia, Senior Divisional Commercial Manager of Railways, opened the Exhibition for the public in the presence of a large number of visitors and special invitees, including Dr. Daljeet Singh, an eminent eye surgeon of Amritsar. Wide media coverage of the scheduled programme of the special train and its



Vigyan Rail gets a colourful reception at Bikaner with Rajasthani women performing a folk dance on the platform at the inaugural function.

A volunteer explaining one of the displays in the ICAR coach to student visitors at Ferozepur.



Students throng the platform waiting to enter Vigyan Rail at Amritsar.



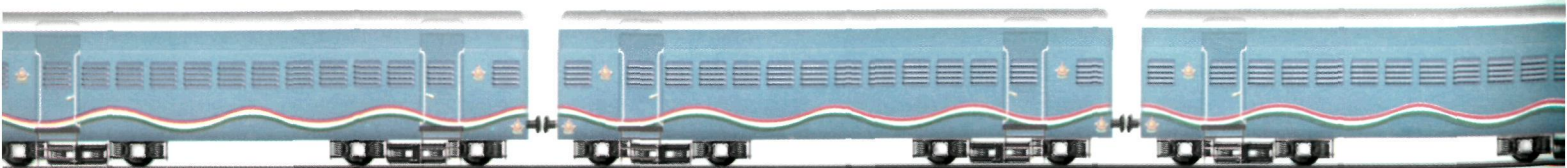
inauguration drew over 55,000 visitors to the railway station. Students evinced special interest and were eager to know the minutest details about the exhibits.

From Amritsar the train moved to Pathankot in the evening of August 5 and was opened to the public the following morning by Shri Harjeet Singh, Deputy Commissioner, Gurdaspur. Among the special invitees at the inaugural function was Shri Harminder Singh, Sub Divisional Magistrate, Pathankot. The District Education Officer had instructed the schools to arrange for the visit of their wards to the Exhibition. The Deputy Commissioner announced an essay competition for students on the Vigyan Rail and said that prizes would be given to five best essays on the following Independence Day. As a result, students made a beeline to the station to view the exhibits. Around 40,000 visitors came to the Exhibition during its four-day halt in Pathankot.

Students viewing exhibits at Pathankot.



On its last leg before returning to New Delhi, the Science Train covered Jalandhar and Kurukshetra. At Jalandhar the Exhibition was opened to the public by Shri Ashok Gupta, Deputy Commissioner in the presence of Shri R. R. Badhan, DEO (Secondary), Shri S.S. Atwal, DEO (Primary) and Shri Subhash Ghosh, Station Superintendent, besides a large number of visitors and members of Bharat Gyan Vigyan Samiti. The wide media coverage of the scheduled programme of Vigyan Rail in the print and electronic media led to a huge turnout of visitors at the railway station to see the exhibits. Students came in large numbers thanks to the special efforts taken by the District Education Officers in charge of primary and secondary schools. During its



five-day halt in Jalandhar nearly 1.5 lakh visitors came to see the exhibits despite heavy rains. For a small town this was a significant number, indicating the interest evoked by the Exhibition among the common people. Many came from far off places like Ramgarh and Adampur. The rush was such that one had to wait in queue for at least 3 hours before getting into the train to see the exhibits but the visitors did not mind it. Shri Sanjeevan Didwal was the local coordinator.

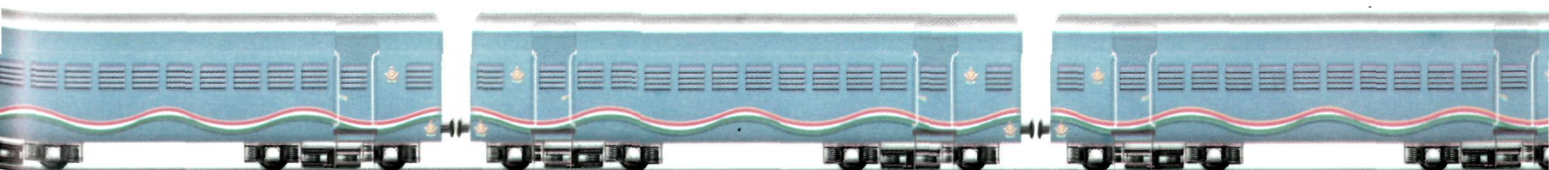
At Kurukshetra, the famous pilgrim centre, Shri Subhash Goyal, Deputy Commissioner opened the Science Exhibition for the public on August 14. As per schedule the Exhibition should have been inaugurated on August 13 but the train arrived at Kurukshetra only on the night of August 13 due to damage to railway track by heavy rains. Shri N. Premchand DDO, Shri Attar Singh, Station Superintendent and Shri S. Kumar of Kurukshetra Panorama and Science Centre were among the special invitees present on the occasion. During its two day halt in Kurukshetra the Exhibition attracted around 20,000 visitors. The Kurukshetra Panorama and Science Centre sustained the interest of the students by organising drawing, quiz and other competitions for them at the platform. The last day of the halt happened to be a holiday on account of Independence Day and the rush of visitors increased considerably.

On August 16 the train returned to its base in Safdarjung Railway station in New Delhi after covering a total distance of 15,000 kilometres and halting at 60 railway stations over a period of eight months, showcasing the country's heritage and achievements in the field of science and

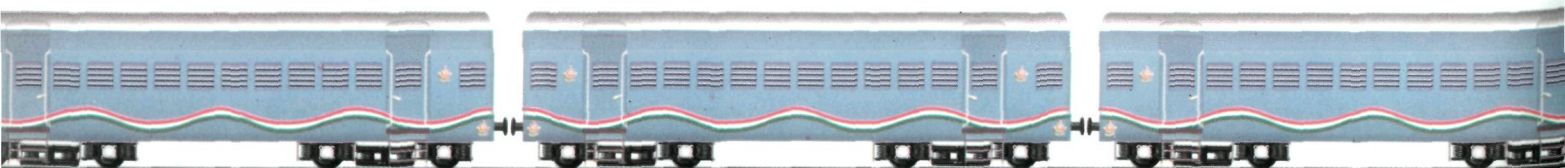


Shri Ashok Gupta, Divisional Commissioner, cutting the tape to open the exhibition at Jalandhar.

Students taking part in a drawing competition in one of the coaches at Kurukshetra.



They commended the efforts put in by all those associated with the journey to promote awareness among the common people about the contribution of science and technology to national development and kindling the interest among the youngsters to take to a career in science and technology. Shri Sibal noted that the Vigyan Rail was a resounding success, having attracted 5 million visitors, a large number of them students.



The success of any venture is determined by the public response and media reaction to it. Judged from this angle the Vigyan Rail Project of the Vigyan Prasar could be regarded a resounding success in making the people aware of the nation's scientific heritage and achievements on the one hand and kindling interest in science among the youngsters to encourage them to take up science as a career. In a vast country, where the majority of the population lives in rural and remote areas, the reach of conventional methods of communication can only be limited. The Vigyan Rail was thought of as an effective method to reach the unreached because the railway network touched every nook and corner of the country. Going by the number of visitors at each of the 60 stations, where the Vigya Rail halted, and the interest evinced by them in the exhibits the first-ever attempt to reach out to the people through the vast network of Indian Railways had undoubtedly been quite fruitful.

The Science Exhibition on Wheels attracted not less than 25,000 visitors at every halt and in some places the figure crossed several lakhs. For instance, Bareilly created a history of sorts with a record turnout of 2.5 lakh visitors over a period of three days. The schedule was such that the Vigyan Rail covered the northern region during winter

वैज्ञानिक प्रगति से लोगों को परिचित कराने की जरूरत

प्रधानमंत्री अटल बिहारी वाजपेयी ने कहा कि देश में विज्ञान एवं प्रौद्योगिकी के क्षेत्र में हुई प्रगति को जन-जन तक पहुंचाने की जरूरत है। इन अवसरों को आम लोगों तक पहुंचाकर हमारे विज्ञान एवं प्रौद्योगिकी के प्रति जागरूकता पैदा की जा सकती है। इससे लोगों को परिचित कराने में भारतीय रेल महत्वपूर्ण भूमिका निभा रहा है। प्रधानमंत्री आज समग्र देश के विज्ञान पर 'प्रगति पर विज्ञान रेल प्रदर्शनी' ट्रेन को हरी झंडी दिखाकर रवाना करने के मौके पर आयोजित कार्यक्रम को संबोधित कर रहे थे। प्रधानमंत्री ने कहा

कि प्रगति पर विज्ञान रेल प्रदर्शनी देश के हर क्षेत्र में पहुंचकर लोगों को विभिन्न क्षेत्रों में हुई प्रगति की तस्वीर प्रस्तुत करेगा।

जा सकता है। इस मौके पर रेलमंत्री नितीश कुमार ने कहा कि विज्ञान रेल प्रदर्शनी खासकर युवाओं में वैज्ञानिक प्रगति के प्रति चेतना जागृत करेगी।

वाजपेयी ने हरी झंडी दिखाकर रवाना की विज्ञान रेल

उन्होंने कहा कि भारतीय रेल पिछले डेढ़ सौ साल से देश की आर्थिक एवं सामाजिक प्रगति में महत्वपूर्ण योगदान दे रहा है। उन्होंने कहा कि रेल को पहुंच आम आदमी तक है और रेल के माध्यम से विज्ञान एवं प्रौद्योगिकी के क्षेत्र में हुई प्रगति को लोगों तक पहुंचाया

उन्होंने कहा कि प्रधानमंत्री का यह सपना, जिसमें भारत को 2020 तक विकसित राष्ट्र बनाया है, को साकार करने में बल मिलेगा। उन्होंने कहा कि इस प्रदर्शनी में भारतीय रेल ने पिछले डेढ़ सौ साल में जो प्रगति की है, उसको दर्शाया गया है।

इस अवसर पर मानव संसाधन विकास मंत्री डॉ. भुरली मनोहर जोशी ने कहा कि विभिन्न संस्थाओं का समायोजन विज्ञान के माध्यम से हो संभव है। उन्होंने कहा कि आज विज्ञान से अज्ञात कोई भी क्षेत्र नहीं रह गया है। प्रगति पर विज्ञान रेल-वैज्ञानिक प्रदर्शनी ट्रेन एक साल तक देश के 56 प्रमुख शहरों में जाएगी और एक शहर में दो से पांच दिन तक रुकेगी। इस अवसर पर विज्ञान एवं प्रौद्योगिकी राज्यमंत्री बच्चू सिंह रावत, रेल राज्यमंत्री कांतारीदा आगर, पारितोष और दिल्ली के उपराज्यपाल विजय कपूर उपस्थित थे। (स.स.)

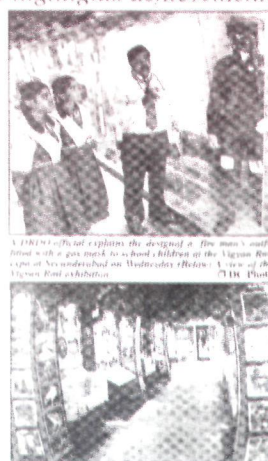


सफरतंग रेलवे स्टेशन पर सोमवार को विज्ञान रेल को रवाना करते प्रधानमंत्री अटल बिहारी वाजपेयी (बाएं) व मानव-बाले के साथ रवाना कैप्टन : ललित मोहन जोशी/राष्ट्रीय सहारा

CITY ARTS & CULTURE Science stops at rail station Mobile expo highlights achievements of scientists

From The Bharat

Hyderabad, April 8 (ANI) The Vigyan Rail, a mobile science exhibition, has arrived in Hyderabad on Wednesday. The exhibition, which is a part of the Vigyan Prasar project, aims to popularise science among the common people. It features a wide range of exhibits, including models, charts, and interactive displays, which are designed to make learning fun and engaging. The exhibition is being held at the Secunderabad railway station, where it will remain for a few days before moving on to other parts of the city. The Vigyan Rail is a unique initiative that brings science to the doorstep of the people, making it accessible to all, regardless of their background or education level. It is a great opportunity for students and the general public to learn about the latest developments in science and technology. The exhibition is a testament to the government's commitment to promoting science and innovation in India.



ON THE MOVE

- 1 The Vigyan Rail has 12 compartments for exhibits and activities.
- 2 Eighteen government departments in all have participated and showcased their achievements.
- 3 Exhibits, models, charts and even robot technologies like multi-media and virtual reality are being used.
- 4 The exhibition showcases the progress along with latest in the field of science and technology.
- 5 DRDO has exhibited and released all space research like Bhaskara, Pustak, Nag and Agni. Also, rockets and missiles are on display.
- 6 CSIR has showcased achieving the patent rights of various drugs and biotechnology.
- 7 The science and technology expo will continue until April 12.

Rashtiya Sahara,
16 December
2003.

Deccan Chronicle,
Hyderabad,
8 April 2004.



मकाळ वृत्तसेवा

A young boy with dark hair, wearing a white shirt and a necklace, is looking at a large mural on a wall. The mural depicts a village scene with several figures, including a man in a red shirt and a woman in a white shirt, and a building with a thatched roof. The boy is standing in front of the mural, looking at it with interest.

preserve it. They also became aware of the opportunities available for tapping renewable sources to meet their energy needs, enhancing their farm output and preventing diseases. In short, they returned home richer in knowledge about the contributions of science and technology to the society.

Another encouraging aspect was the response that the Vigyan Rail evoked among students. One of the main objectives of the Exhibition was to kindle among the youngsters an interest in science. In recent years the number of students getting into the science stream in colleges and pursuing research as a career had been declining. This trend had naturally caused concern. The overwhelming response among the younger generation to the Science Exhibition on Wheels showed that such an effort could effectively address this issue. Students far outnumbered the rest among the visitors. It was not just the number of students who visited but the inquisitiveness they exhibited, which was quite encouraging and promising.

Another notable aspect was that the students took their visit to the Exhibition seriously as if it was a part of their studies. They did not view it as a picnic. They came armed with notebooks and pens, jotted down important points from the Exhibits, put searching questions to the guides on the Exhibits and wrote down the replies. They regarded the information as a valuable supplement to what they learnt in the classroom. The school authorities too recognised the educative value of the Vigyan Rail and placed the school buses at their disposal to transport students to the railhead. In some places the authorities declared a holiday for educational institutions so that the students

বাৰটা দবাৰে কঢ়িয়াই আনিছে অভিনৱ 'চলন্ত প্ৰদৰ্শনী'
আজি গুৱাহাটী পাবহি 'বিজ্ঞান ৰে'ল'

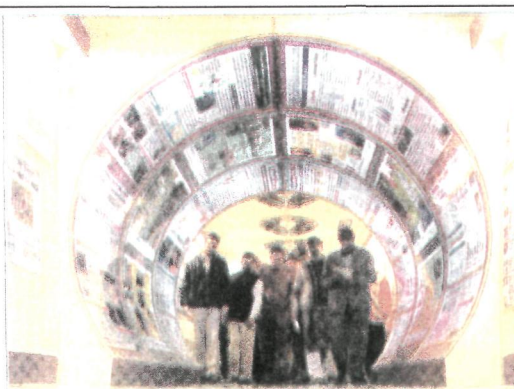
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Patidin, Guwahati, 15 February 2004.

Amar Ujala, Bareilly, 7 January 2004.

आपके शहर
पहुँचा ज्ञान-विज्ञान
का अजूबा संसार

काव्याल्लिख संवात्तुदाता

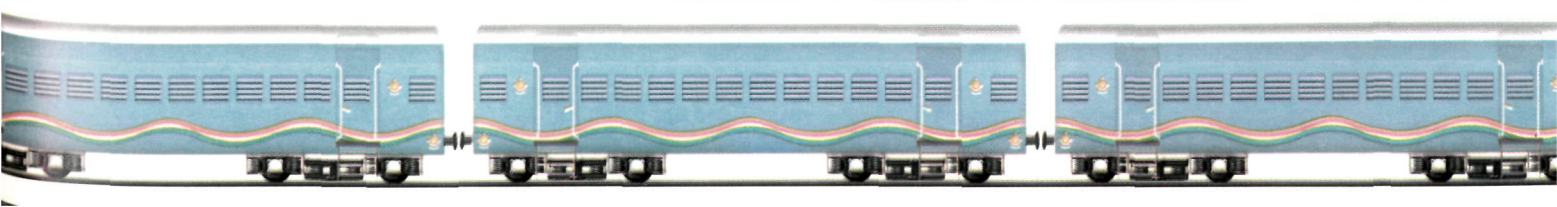
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विज्ञान रेल में अन्य अनेक वस्तुओं से सुजड़ते विज्ञान एवं प्रौद्योगिकी राज्यमंत्री जयदीप सिंह राजत ।

...विज्ञान रेल को चैन से देखने तो दो

काली। ऐसे प्रदर्शनों का भी क्या भावना। तबसे काली देवी भूत, भस्म, पीछे छोड़ ले करे। विमान लेते है भीतर भस्म लेते विमान भूत बज्जी पर खड़ा भस्म ले। भाती भूत भस्म साथ लेने और भस्म लेती दिया गान। कहे कर ती आने भस्म ले रहा हुम्न भस्म लेते मायुम लीकन पतन। विमान भस्म लेती का प्रकृत भस्म कान कान है इससे लिखित भावना पर खसस बात है। एक भस्म लेती को छोड़ दे।

सांझना के मुकामले लिखित भावना आता तमिरीयों पर कानना कर है। तमिरीयों आतीजनने के एक को खुले से प्रदर्शनी में आने को बाजना उड़ता सायन विमान कर लिख है। इससे उठे लोको काल लयाना करे सायन यह हाता का आँह बज्जी पर आलायन उठे फेकपट आने बज्जी को निम्न लेते गाने को। पोतीक भावना के गाने भस्म मुकामी को उठाना बज्जी में बज्जी विमान को उठाने प्रदर्शने को खोजे। उठे कर काल भावना का उठे कर उठे कर। ऐसे हुम्न भी उठाने पतन से लिखने हाता उठे भाती और कागज कानना लेकर भूतभावन उठाने से



**Bartamaan,
Alipurduar, West
Bengal,
12 February 2004.**

১২ ফেব্রুয়ারি ২০০৪ বর্তমান [৩]

বিজ্ঞান রেল এল আলিপুরদুয়ারে

আলিপুরদুয়ার: 'বিজ্ঞান রেল' এল আলিপুরদুয়ারে। বুধবার সকালে বিজ্ঞান বিষয়ক প্রদর্শনী নিয়ে ট্রেনটি আলিপুরদুয়ারে আসে। আলিপুরদুয়ার জংশনে এই প্রদর্শনীর উদ্বোধন করেন আলিপুরদুয়ারের ডি আর এম পম্পা বব্বর। ট্রেনটির ১২টি কামরায় বিজ্ঞানের তথ্যসমৃদ্ধ প্রদর্শনীর ব্যবস্থা রয়েছে। আগামী শনিবার পর্যন্ত ট্রেনটি আলিপুরদুয়ারে থাকবে। রেল কর্তৃপক্ষ জানিয়েছে, গত ১৫ ডিসেম্বর ট্রেনটি দিল্লি থেকে যাত্রা শুরু করে। -বি এন এ

Rashtradoot, Ajmer, 16 July 2004.

अजमेर में विज्ञान रेल प्रदर्शनी का उद्घाटन

—काशीराम चौधरी—

আজমেরে ১৬ জুলাই বিজ্ঞান রেল প্রদর্শনী খোলা হয়েছে। প্রদর্শনীতে বিজ্ঞানের বিভিন্ন ক্ষেত্রে অগ্রগতির প্রদর্শনীর মাধ্যমে বিজ্ঞানের গুরুত্ব তুলে ধরা হয়েছে। প্রদর্শনীতে বিজ্ঞানের বিভিন্ন ক্ষেত্রে অগ্রগতির প্রদর্শনীর মাধ্যমে বিজ্ঞানের গুরুত্ব তুলে ধরা হয়েছে।

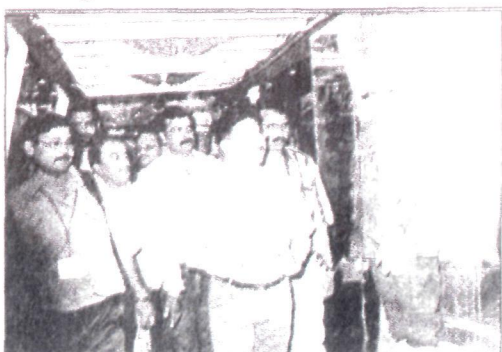
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स्कूली छात्र-छात्राओं का सैलाब उमड़ा



বিজ্ঞান রেল প্রদর্শনী का अवलोकन करते किता कलकत्ता आइएनी भगत। प्रम कोटा, महेश नरयण

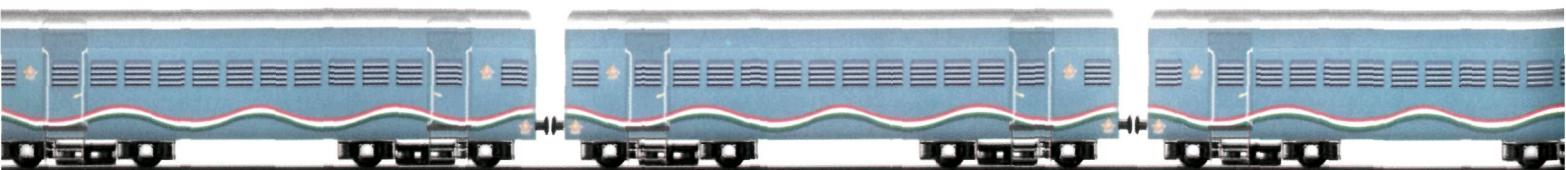
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could visit the Exhibition. In some places the teachers planned to conduct a test based on the Exhibits and at Pathankot the Deputy Commissioner announced an Essay Competition for students based on the exhibits. In Allahabad the Headmaster of one of the schools said that one question paper would be set on the exhibits in the school examination. All these made the students study the exhibits in depth instead of having a cursory glance at them. Thus, Vigyan Rail offered a unique opportunity for the students and teachers alike, especially in remote areas, to keep abreast of the advances that had been made in the fields of science and technology. This should help the students in their higher studies.

The impact made by the exhibits on the young minds could be gauged from the comments, which some of the student visitors made about their visit. In Lucknow one of girl students was quite impressed by the models of fighter planes and commented that the exposition had strengthened her will to become a fighter pilot. Another student remarked that the Exhibition had generated a lot of self-confidence in him. The exhibits on women scientists were quite inspiring for some of the girl students.

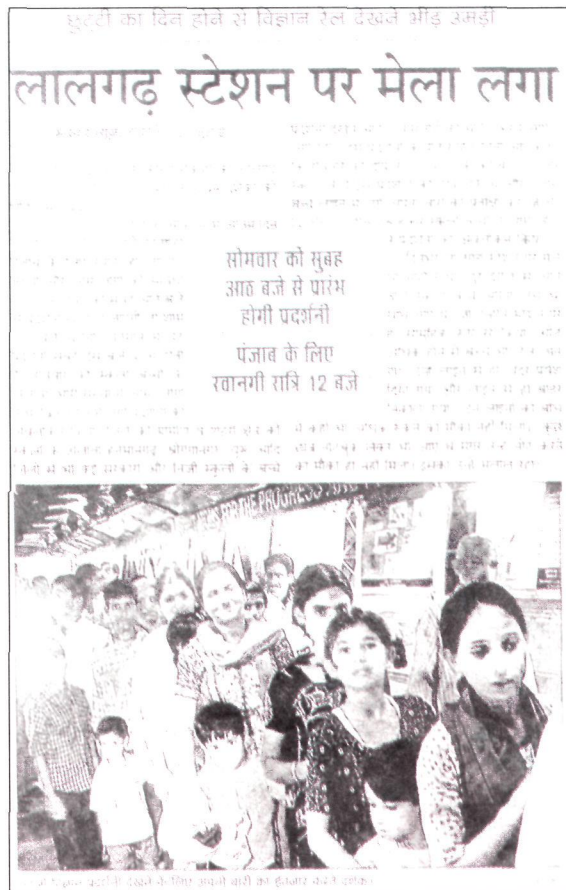
Besides the students, their parents also evinced keen interest in the exhibits. This is quite significant because if the parents are convinced of the importance and value of S&T they would persuade their wards to opt for the science stream and later take to research as a career. For most of the parents the Exhibition was an eye-opener. They might have read in the media periodically about the achievements of Indian scientists but it was the first time that they had had the opportunity to get a feel of them all in one



place. One parent described the exhibits as a compact collection of developments in science and technology. The exhibits generated varied but positive response among the visitors. "A thrilling experience", "enchanting", "exhilarating", "innovative", "marvellous", "educative", "wonderful" – these were some of the epithets used by the visitors about the exhibits. Some of the visitors even went poetic and relied on old sayings to describe succinctly what they felt about the Science Exhibition.

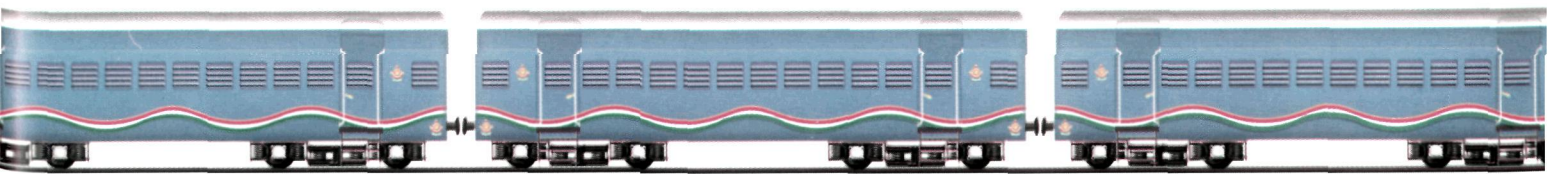
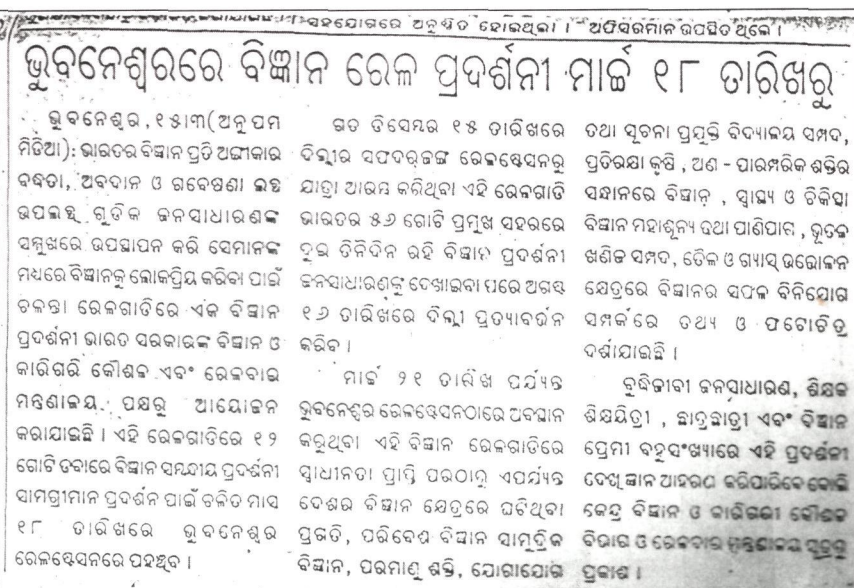
"Yeh Pradarshan to gagar mein sagar hai", commented a visitor. Translated into English it meant, "In this Exhibition the entire ocean has been accommodated in a pitcher". Another commented, "Kuan khud chalkar pyase ke paas aya hai", which meant, "The well itself has come to the thirsty". The former comment brought out the depth and breadth of information provided by the exhibits, while the latter highlighted the way the thirst for knowledge had been quenched by the Exhibition. All these comments brought out the general impression among the visitors that the Vigyan Rail had helped them know many things, which they had not known earlier. This was exactly the objective of the Exhibition and the visitors' comments showed that the Exhibition had largely achieved its objective.

Let us now look at the media reaction, which is an important index of the success of any venture. The media is always regarded as a mirror of public opinion and public aspirations. As such the extent of media coverage reflected the importance of any venture. Judged from this point of view also the Vigyan Rail project could be considered a success. The eight-month journey of the Science Exhibition on Wheels received



Dainik Bhaskar, Bikaner, 26 July 2004.

Anupam Bharat, Barhampur, Orissa, 16 March 2004.

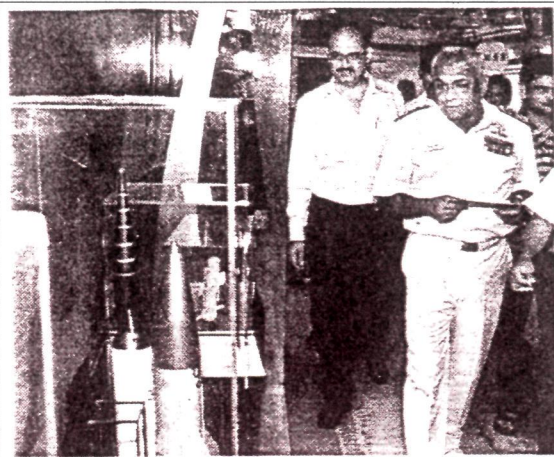


case the nation's achievement in science and technology, which had helped to change the image of India as a land of snake charmers. "There is no doubt that scientific temper is needed for the country to progress and that spreading awareness and inculcating pride in the scientists' achievements is indeed a first step", *The Tribune* Editorial observed. In general the media reports on the Vigyan Rail were extremely positive.

It is clear from the reaction of the visitors and the reports in media that the Vigyan Rail has been extremely successful in bridging the gap between science and people. It has helped in promoting awareness among the people about the contribution of science and technology in various fields of immediate relevance to the community at large and encouraging the younger generation to evince interest in science as a career. It was no easy task to bring together so many government agencies under one umbrella for a common cause and the Exhibition was a success it was due to the effective coordination among all the participating scientific departments and organisations.



Dina Bhumi, Chennai, 17 April 2004.



The Flag Officer Commanding-in-Chief of the Eastern Naval Command, O.P. Bansal, going round the 'Vignan Rail' after inaugurating it on Tuesday in Visakhapatnam. The Divisional Railway Manager of East Coast Railway, S.V. Arya is also seen.

'Vignan Rail' arrives in Vizag

VISAKHAPATNAM: 'Vignan Rail', a science exhibition on wheels, arrived here on Tuesday on a five-day visit as part of its countrywide journey. The specially designed train carries exhibits, charts, models, hand-on-exhibits, computer mediated quiz, video and multi-media, etc., to highlight the achievements made by the country in science and technology in the last 50 years.

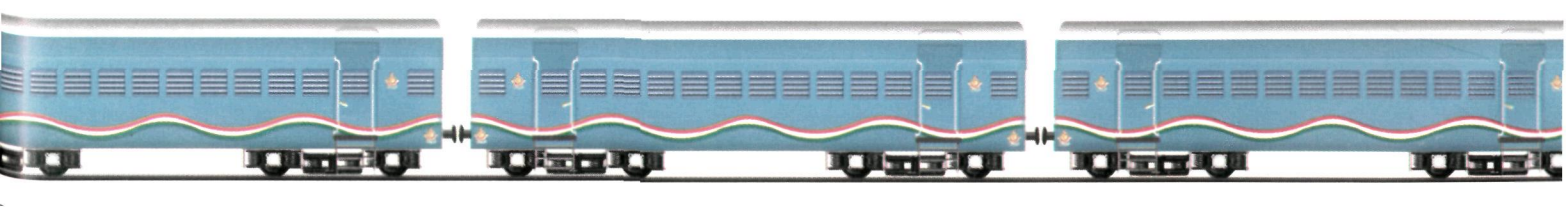
As many as 12 Government departments are displaying their achievements on this show, which was flagged off by the Prime Minister, Atal Bihari Vajpayee, in New Delhi on December 15 last.

It is covering the length and breadth of the country stopping at 56 stations, including Visakhapatnam, Secunderabad and Tirupati in the State. It will return to New Delhi on August 16. The Flag Officer Commanding-in-Chief of the Eastern Naval Command, O.P. Bansal, declared open the exhibition for public at the railway station on Tuesday.

The East Coast Railway's Divisional Railway Manager (Waltair), S.V. Arya, welcomed the gathering.

The Hindu,
Visakhapatnam,
24 March 2004.

Dainik Bhaskar,
Kota, 14 July
2004.



EPILOGUE

The resounding success of the Vigyan Rail is indeed a matter of great satisfaction. When the idea was mooted everyone felt it was a good concept, but being the first ever such attempt in the world one could not be sure of how it would fare and be received by the public. The overwhelming public response only shows that there is thirst for knowledge and Vigyan Rail has proved to be an ideal method to quench this thirst. But there is still a long way to go to achieve the goal of promoting scientific temper and creating greater awareness about the value of S&T among the general public. India is a vast country and the Vigyan Rail could touch only 60 stations. There are still many places left out and for covering them in phases the Vigyan Rail should be continued with the exhibits updated.

Apart from covering more railway stations the Exhibition should reach out to the areas around the railhead. In this context Professor V. S. Ramamurthy, Secretary to Department of Science and Technology, has mooted an idea. In an interview to *Frontline* he suggested that selected exhibits could be taken to places surrounding the railhead on road because the train route did not cover the entire country. "A sort of feeder service can help take a scaled-down version of exhibition to those who could not come to the railhead", he observed. This is worth pursuing.



Concluding Function at Delhi Safderjung Railway Station (18 August 2004). From left, Dr. Vinay B. Kamble, Shri K.K. Jaswal, Secretary (DIT), Secretary (DIT), Professor V. S. Ramamurthy, Secretary (DST), Shri Kapil Sibal, Minister (S&T and Ocean Development), and Shri M. V. Kamath, President, Vigyan Prasas Society. Smt. Ramamurthy and Smt. Kamble are also seen.

Meanwhile, the impressive show made by Vigyan Rail in its first cross-country run has made the Vigyan Prasas President Shri M. V. Kamath prescribe a much larger diplomatic role for Vigyan Rail. In an interview to *Frontline* he has mooted the idea of sending Vigyan Rail not only to Pakistan and Bangladesh but also to some of the SAARC countries. "I think it would be a wonderful idea for the Vigyan Rail to play



the role of a peace train to Pakistan”, he observed.

Thus, the Vigyan Rail has crossed the pilot project stage to become a part of the programmes of Vigyan Prasar to take science to the people and promote scientific temper among the general public. The experience in running the Science Train has brought out certain lessons, which should be addressed in future. One of the lessons relates to the schedule of the journey itself. In our country the weather conditions vary sharply between one region and another. Adequate thought should be given while drawing up the journey schedule so that the visitors are not put to much inconvenience due to severe cold or scorching heat. Another lesson relates to the period of halt. In most places the period of halt ranged between two and five days. This was found inadequate especially in the context of the overwhelming public response, which the Exhibition generated, and the resultant rush.

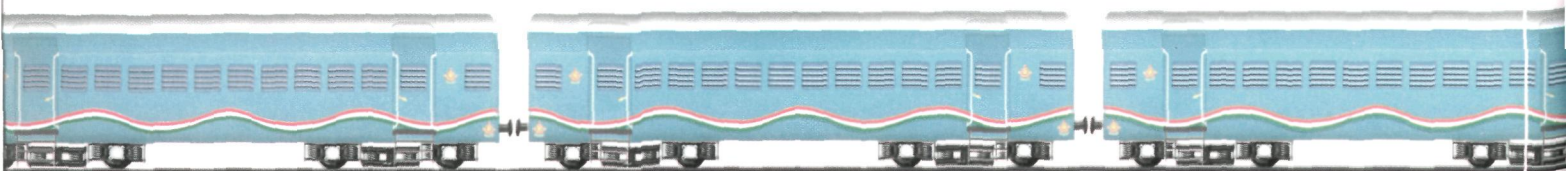
Shri Kapil Sibal, Minister (S&T and Ocean Development), signing the visitors book.

Unlike in an exhibition on a sprawling ground the space in a train is not enough to accommodate too many visitors at any given time. As a result the visitors had to wait for a long hours in the queue before gaining entry into the train. The period of halt should be increased.

Since the space available in a train is limited too many working models could not be put up. The exhibits by and large had to be in the form of panels containing blown-up photos, charts, etc. Only a few organisations had put up models and these were found to attract the visitors more than the other exhibits. Hence the lesson is that ways and means should be explored to put up more models in the Exhibition in future.

One aspect that needs consideration relates to the number of guides. The educational level of most of the visitors is such that they cannot on their own understand the exhibits, which were highly scientific and technical at times. Recognising this the participating departments had deployed experts to explain the exhibits. In addition, the local coordinators recruited volunteers from the faculties of local educational institutions briefed them about the exhibits and trained them in the art of explaining the exhibits to the visitors. But it was found that the number of such guides was not adequate to meet the demand. In future phases of Vigyan Rail, this aspect should be kept in mind and steps to have adequate number of guides and volunteers would need to be taken.

The text on the Panels was either in English or in Hindi. This had put the visitors who did not know either of these languages at a disadvantage. Visitors from rural areas knew only their mother tongue and the ru-

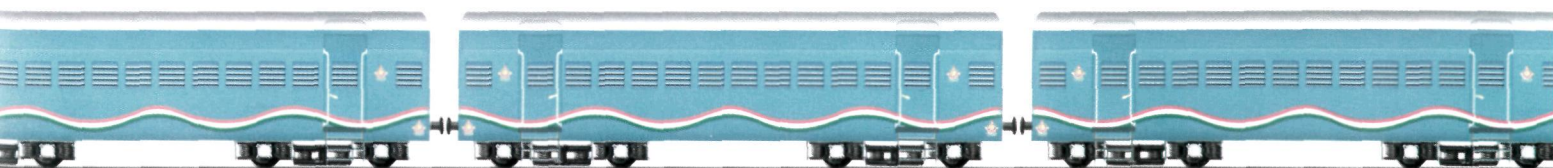


ral folk in non-Hindi speaking states found it difficult to follow the text in the exhibits without assistance from guides who were conversant with the local language. In many places the visitors wrote that the text should be in the local language. Admittedly it is not possible to have the exhibits in all the national languages listed in the Constitution. But thought should be given to exploring ways and means of solving this problem. Otherwise the basic objective of the Exhibition to reach out to the common people may not be achieved in full.

For Vigyan Prasar it was indeed a fruitful experience and the success of this venture was in no small measure due to the hard and devoted work of the representatives of the different participating agencies and effective coordination by the officials of the Railway Ministry. Since the value of the Exhibition has been established beyond doubt, it would be worthwhile to consider the setting up of a permanent organisation under the Department of Science and Technology to conduct such Science Exhibition on Wheels on a continuous basis.

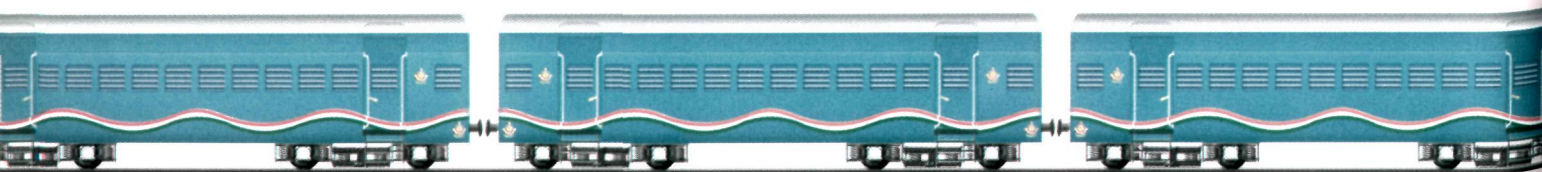


Shri Kapil Sibal, Minister (S&T and Ocean Development), being interviewed by the media at Delhi Safder Jung Railway Station.



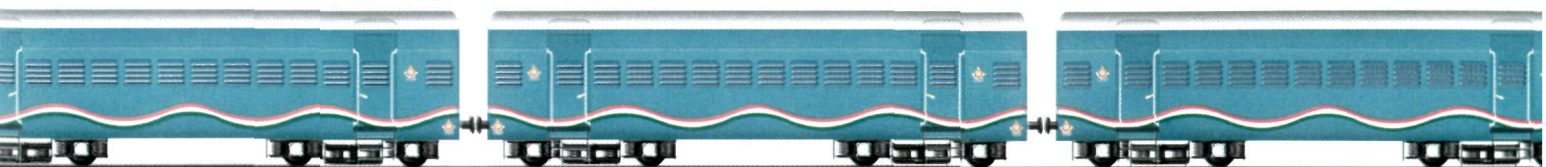
PARTICIPATING MINISTRIES/ DEPARTMENTS

- National Council for Science Museums (NCSM)
- Ministry of Environment and Forest
- Department of Atomic Energy (DAE)
- Department of Information Technology (DIT)
- Department of Telecommunication (C-DOT, DoT)
- Ministry of Water Resources and Central Water Commission
- Department of Ocean Development (DOD)
- Council of Scientific and Industrial Research (CSIR)
- Defence Research and Development Organisation (DRDO)
- Ministry of Non-Conventional Energy Sources (MNES)
- Indian Council of Agricultural Research (ICAR)
- Indian Council of Medical Research (ICMR)
- Indian Space Research Organisation (ISRO)
- Vigyan Prasar (VP)
- India Meteorological Department (IMD)
- Survey of India
- Technology Information, Forecasting and Assessment Council (TIFAC)
- Department of Biotechnology (DBT)



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- Bharat Sanchar Nigam Ltd.
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- Ministry of Non-Conventional Energy
- Bureau of Indian Standards
- Border Security Force
- Department of Ocean Development
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- Life Insurance Corporation of India
- Bharat Heavy Electricals Ltd.



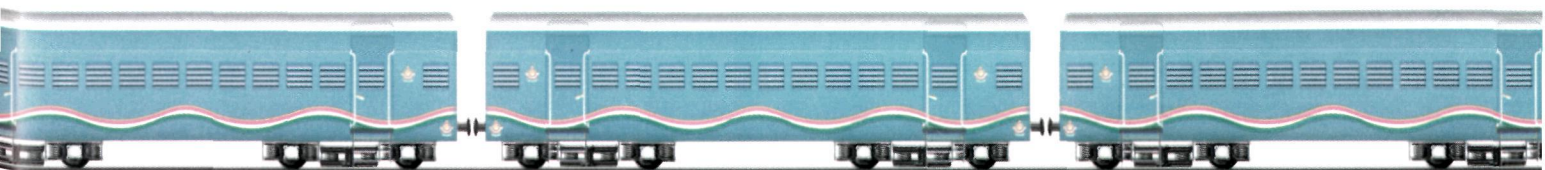
ITINERARY

S.No	Date of Arrival	Days Halt	Station
1.	15.12.2003	7	DELHI-SAFDARJUNG
2.	22.12.2003	3	CHANDIGARH
3.	25.12.2003	3	AMBALA
4.	28.12.2003	2	HARIDWAR
5.	30.12.2003	4	DEHRADOON
6.	03.01.2004	3	KATHGODAM
7.	06.01.2004	3	BAREILLY
8.	09.01.2004	5	LUCKNOW
9.	14.01.2004	4	KANPUR
10.	18.01.2004	6	ALLAHABAD
11.	24.01.2004	5	VARANASI
12.	29.01.2004	1	SONEPUR*
13.	30.01.2004	4	MUZAFFARPUR
14.	02.02.2004	3	SAMASTIPUR
15.	05.02.2004	2	BARAUNI
16.	07.02.2004	4	NEW JALPAIGUDI (SILIGURI)
17.	11.02.2004	4	NEW ALIPURDUAR
18.	15.02.2004	6	GUWAHATI
19.	21.02.2004	3	DIMAPUR
20.	24.02.2004	4	DIBRUGARH
21.	28.02.2004	5	PATNA
22.	04.03.2004	3	DURGAPUR
23.	07.03.2004	3	HATIA
24.	10.03.2004	8	HOWRAH
25.	18.03.2004	3	BHUBHANESWAR
26.	21.03.2004	2	CUTTACK*
27.	22.03.2004	5	VISHAKHAPATNAM
28.	27.03.2004	5	DURG
29.	01.04.2004	4	NAGPUR
30.	05.04.2004	7	SECUNDERABAD
31.	12.04.2004	4	TIRUPATI
32.	16.04.2004	7	CHENNAI
33.	23.04.2004	3	KANYAKUMARI

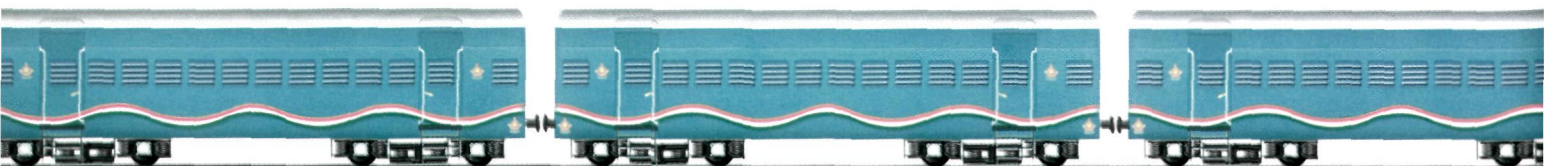


S.No	Date of Arrival	Days Halt	Station
34.	26.04.2004	5	THIRUVANANTHAPURAM
35.	01.05.2004	3	ERNAKULAM
36.	04.05.2004	2	PALGHAT
37.	06.05.2004	1	MANGALORE*
38.	07.05.2004	3	COIMBATORE NORTH
39.	10.05.2004	8	BANGALORE
40.	18.05.2004	3	HUBLI
41.	21.05.2004	4	MADAGAON
42.	25.05.2004	3	RATNAGIRI
43.	28.05.2004	8	MUMBAI CENTRAL
44.	05.06.2004	5	PUNE
45.	10.06.2004	5	VADODARA
46.	15.06.2004	7	AHMEDABAD
47.	22.06.2004	5	RAJKOT
48.	27.06.2004	7	BHOPAL
49.	04.07.2004	4	AGRA
50.	08.07.2004	5	JAIPUR
51.	13.07.2004	2	KOTA
52.	15.07.2004	3	AJMER
53.	18.07.2004	5	JODHPUR
54.	23.07.2004	4	BIKANER
55.	27.07.2004	4	FIROZPUR
56.	31.07.2004	5	AMRITSAR
57.	05.08.2004	4	PATHANKOT
58.	09.08.2004	4	JALANDHAR
59.	13.08.2004	3	KURUKSHETRA
60.	16.08.2004	5	DELHI-SAFDARJUNG

* Unscheduled halt

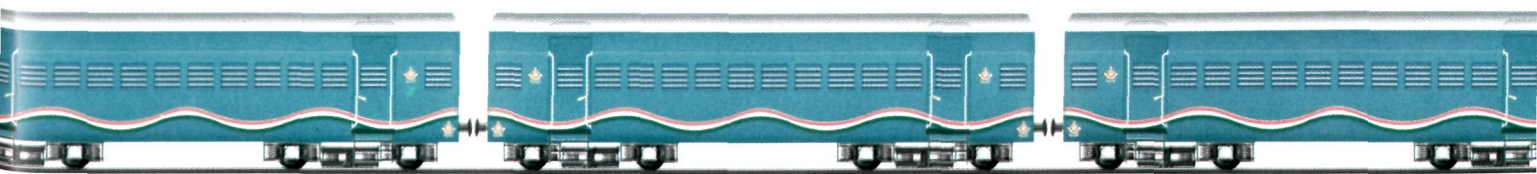


ROUTE MAP OF VIGYAN RAIL



LIST OF NODAL OFFICERS OF DEPARTMENTS/MINISTRIES PARTICIPATING IN VIGYAN RAIL PROJECT

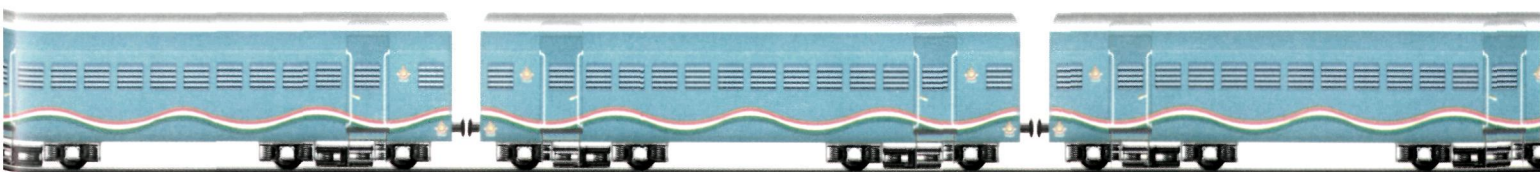
Sl.No.	Department/Ministry	Name & Address
1.	Ministry of Culture	Shri P.K. Bhaumik Dy. Director General National Council of Science Museums, Block - GN, Sector -V, Bidhan Nagar Kolkata 700 091
2.	Ministry of Environment and Forests	Shri S.K. Saraswat Director National Museum of Natural History, Barakhamba Road, New Delhi - 110 001
3.	Department of Atomic Energy	Shri S.K. Malhotra Head, Public Awareness Division, Department of Atomic Energy, Anushakti Bhavan, CSM Marg, Mumbai 400 039
4.	Department of Information Technology, Ministry of Communication and Information Technology	Dr. Ram Gopal Gupta Scientist 'F', Deptt. of Information Technology, Electronics Niketan, CGO Complex, Lodi Road, New Delhi - 110 003
5.	Department of Telecommunication, Ministry of Communication and Information Technology	Ms. Taruna Singh Sr. Manager, C-DOT, Room No.911, 9 th Floor, Akbar Bhawan, Chanakyapuri, New Delhi 110 021
6.	Ministry of Water Resources	Shri Pradeep Kumar Superintending Engineer, Planning Circle, Central Water Commission, Qtr.No.1065-68 Type-V, NH-IV, Faridabad 121001



7. Department of Ocean Development
Shri Rakesh Kumar
Dy. Secretary,
Department of Ocean Development,
Mahasagar Bhavan,
CGO Complex, Lodi Road,
New Delhi - 110 003
8. Council for Scientific and Industrial Research (CSIR)
Shri Daljit S. Bedi
Head,
Unit for Science Dissemination
Council for Scientific and Industrial Research,
Anusandhan Bhavan,
Rafi Marg, New Delhi - 110 001
9. Ministry of Defence
Brig. Umang Kapoor
Director, C-TEC
DRDO HQ,
Defence Research & Development Organization,
Room No. 112-A, 'B' Wing,
Sena Bhawan
New Delhi 110 011
Colonel N.M. Murali/Lt. Col. Thatte
Joint Director, C-TEC,
DRDO HQ,
Defence Research & Development Organization,
Room No. 235-B, South Block,
New Delhi 110 011
10. Ministry of Non-conventional Energy Sources
Shri V. Jayachandran
Director,
Ministry of Non-conventional Energy Sources,
CGO Complex, Lodi Road,
New Delhi - 110 003
11. Ministry of Agriculture
Shri Anil K. Sharma
CP & PRO,
Indian Council of Agricultural Research
Krishi Bhawan,
New Delhi - 110 001



12. Ministry of Health and Family Welfare
Dr. V.K. Srivastava,
Dy. Director General,
Indian Council of Medical Research,
P B No.4911, Ansari Nagar,
New Delhi - 110 029
13. Indian Space Research Organisation (ISRO)
Shri S. Krishnamurthy
Director, Publication & Public Relations
Unit, (ISRO)
Department of Space,
Antariskh Bhavan,
New BEL Road,
Bangalore - 560 094
14. Vigyan Prasar
Dr. Subodh Mahanti
Scientist 'F', Vigyan Prasar
A - 50, NCMRWF Building
Sector - 62, NOIDA - 201307 (U.P.)
15. Survey of India
Dr. M. C. Tiwari,
Deputy Director,
Survey of India
West Block, IV Wing,
R.K. Puram
New Delhi 110 066
16. India Meteorological Department
Shri J.K. Sharma
Director,
India Meteorological Department
Lodi Road,
New Delhi 110 003
17. Technology Information, Forecasting and Assessment Council (TIFAC)
Shri R.K. Gupta
Registrar,
Technology Information, Forecasting and Assessment Council (TIFAC),
Technology Bhavan, New Mehrauli Road,
New Delhi 110 016
18. Department of Biotechnology, Ministry of Science and Technology
Dr. S. Natesh
Advisor,
Department of Biotechnology,
CGO Complex, Lodi Road,
New Delhi - 110 003



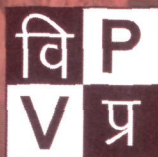
VIGYAN RAIL

B. S. Padmanabhan

Vigyan Rail – Science Exhibition on wheels, was a unique concept in bringing India's scientific heritage and recent achievements to the doorsteps of the people. The Science Exhibition on Wheels, which travelled across the country for about eight months, halting at 60 stations, was conceived, formulated and implemented by Vigyan Prasar jointly with the Ministry of Railways, and with the active support of the Department of Science and Technology. Vigyan Rail was a result of co-operation among 18 Departments/ Ministries of Government of India, engaged in different aspects of Science and Technology. Displayed in 12 coaches, the exhibits included panels depicting India's achievements in the various fields of S&T, working models, hands-on activities, and multi-media shows. The exhibition drew huge crowds wherever it visited. This profusely illustrated book attempts to present a glimpse of the unique Science Exhibition on Wheels and recounts its momentous journey across the length and breadth of the country.

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Vigyan Prasar

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